VI. Improvements

Transportation system improvements were defined for the short-range and long-range time periods, corresponding to the analysis periods used for the identification of transportation deficiencies. The short-range improvements are intended to address existing deficiencies, while the long-range improvements are based on conditions for the 2025 time period.

Improvement Identification Process

The identification of short- and long-range improvements followed a structured process. In the first step, preliminary improvement options were developed to address each of the transportation deficiencies. At this point in the process, the intent was to consider as broad a range of practical options as possible. In some cases, however, due to the nature of the deficiency, there was only one option available (for example, for locations where a turn lane was needed, there was really only one option – installation of a turn lane). Input received from the Task Force, TAC, and members of the public was also considered in the development of the preliminary improvement options.

The preliminary improvement options were reviewed by the ITD Management Team for reasonableness and consistency with ITD policies. Following this, the options were evaluated using the screening criteria described in the previous section. Each option was rated using the relevant criteria and then compared to the other options. Those with the highest comparative rating were identified as draft recommended improvement options.

The draft recommended improvement options were reviewed by the Management Team and then presented for discussion with the Task Force, TAC, and members of the public. The input received was incorporated by the Management Team in identifying the final recommended improvements.

Roadway improvements were developed for the locations described in previous sections as having existing or future capacity, safety, geometric, or traffic operations deficiencies. The general approach that was followed was to identify the improvements necessary to achieve the applicable ITD road standards or to mitigate the deficiency as reasonably as possible. Several other factors were also considered in this approach, however:

- Consistency with ITD policies and practices. An example of this is the ITD practice that avoids the installation of traffic signals along rural highways. This practice is also recommended in *A Policy on Geometric Design of Highways and Streets*, which states that: "Rural intersection control by traffic signals is not desirable. Drivers generally do not anticipate signals in rural areas that have high operating speeds, especially when traffic volumes are relatively low".[59] The

[59] AASHTO, A Policy on the Geometric Design of Highways and Streets, (2001).

avoidance of signals is particularly important along higher-level facilities such as US 89 whose primary function is to carry traffic between areas rather than provide local access.

- Construction of an improvement required to attain a particular standard may be infeasible due to physical or environmental constraints. In these cases, a lesser improvement was identified that could more likely be implemented within the constraints.
- Construction of an improvement required to attain a particular standard may be infeasible due to operational constraints along the roadway. An example of this would be a road segment that is too short to add a passing lane or the existence of a speed zone which would preclude the addition of a passing lane.
- Lack of public support for a particular improvement.

Per ITD's Administrative Policy A-14-02, titled "Roadway Widths",[60] State Highway System routes not designated in an Intrastate Priority Corridor Plan shall meet either the 3R-Interstate or 3R-NHS standards for roadway widths as detailed in the ITD Design Manual for resurfacing, restoration, and rehabilitation (3R) projects. Therefore, all future roadway improvements within two-lane sections of US 89 should be designed in accordance with the typical two-lane cross-section drawing shown in Figure 32, which reflects ITD design standards related to lane width, shoulder width, and clear zone distance for National Highway System (NHS) two-lane rural highways. It should also be used for improvements that will result in wider cross-sections (e.g., two-lane roadways with a two-way center turn lane or passing lanes), with modifications to reflect the added features.

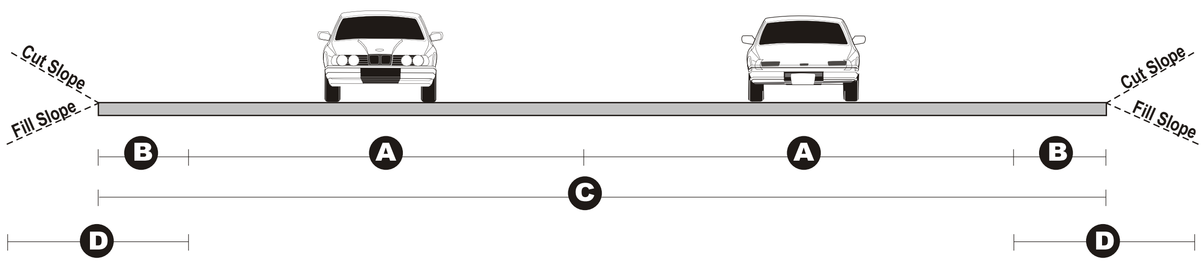
Bicycle and pedestrian improvements are recommended in areas currently lacking the facilities to serve existing and potential future travel demand for these modes. These improvements are focused primarily in the Fish Haven area to serve the significant amount of recreational activity occurring there in the summer months.

Recommended Improvements

All of the recommended improvements are presented in Table F-1 of Appendix F. Each row in the table corresponds to a recommended improvement for a specific location along the corridor. For convenience, each improvement is numbered. Information is presented on the deficiency that the improvement is intended to address, together with miscellaneous notes describing how the recommended improvement was identified, specific features of the recommended improvement, potential impacts, etc. The recommended improvements are also shown by improvement number in Figure 33.

[60] Idaho Transportation Department, Administrative Policy A-14-02 – Roadway Widths, (1999).

U.S. Highway 89 Corridor Plan



Minimum Roadway Widths
Two Lane Rural Highway & Local Roads

Design Year Volume (ADT)	Avg Running Speed (mph/h)	Less Than 10% Trucks			10% or More Trucks**		
		A Lane Width	B Shoulder Width	C Total Width*	A Lane Width	B Shoulder Width	C Total Width*
750 to 2,000 Vehicles	Under 50 mph	10	2	24	11	2	26
	50 mph and over	11	3	28	12	3	30
Over 2,000 Vehicles	All Speeds	11	6	34	12	6	36

*Note: The total width may be reduced 2 feet in mountainous terrain.

**Trucks are defined as heavy vehicles, single unit configuration or larger (6 or more tires).

Source of table values: 2002 ITD Design Manual, Appendix C, Section C.2.6, Fig. C-1. (Table and illustration not taken directly from ITD Design Manual, but constructed using values from table in manual).

Minimum-NHS Clear Zone Distances
(Distance from edge of driving lane)

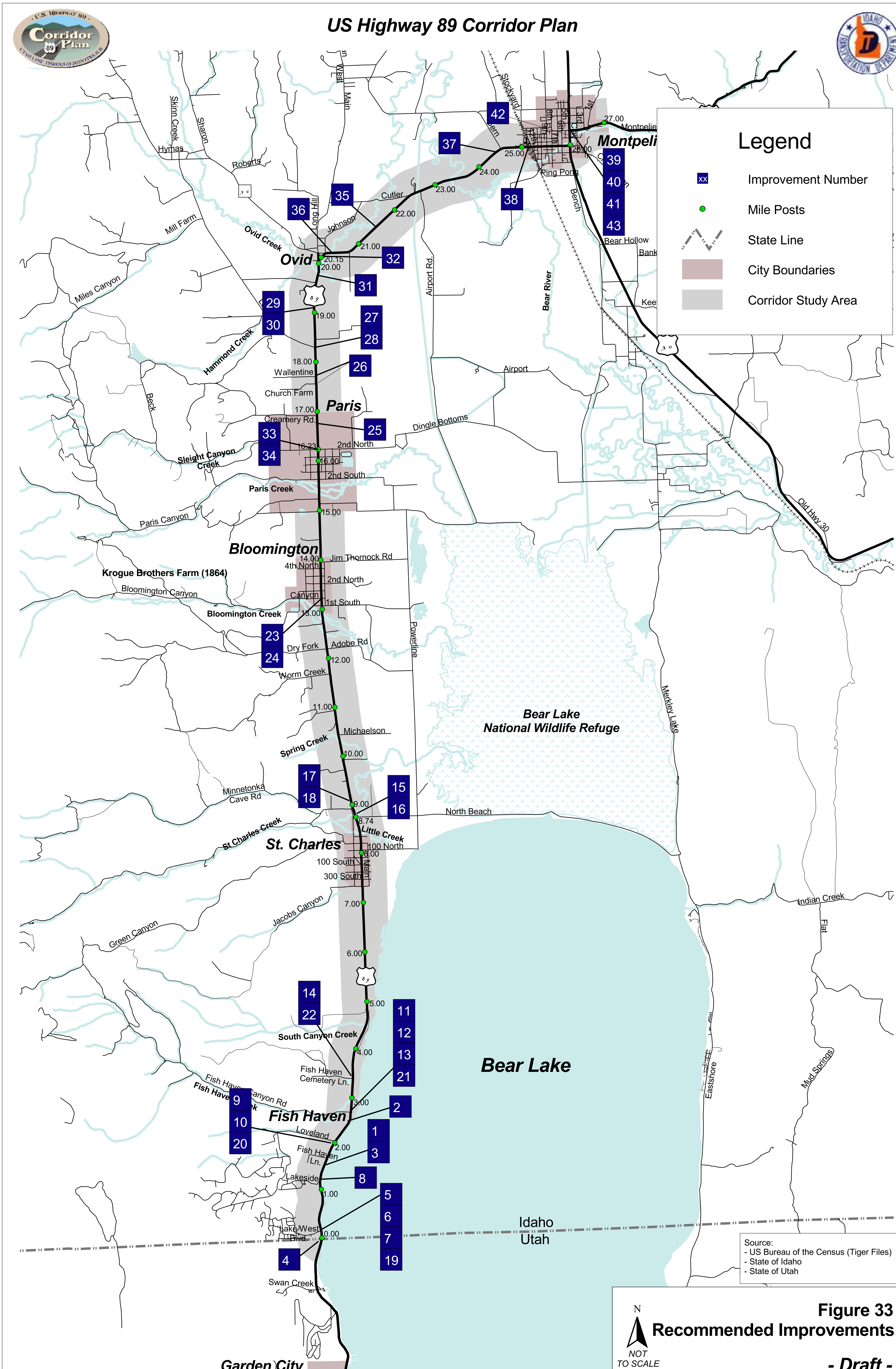
Design Speed	Design ADT	D Fill Slopes			D Cut Slopes		
		6:1 or flatter	5:1 to 4:1	3:1	3:1	4:1 to 5:1	6:1 or flatter
55 mph	1500-6000	20	24	**	14	16	20
	Over 6000	22	26	**	16	20	22
65/70 mph	1500-6000	28	30	**	16	22	26
	Over 6000	30	30	**	22	26	28

**Since recovery of vehicles is less likely on 3:1 slopes, this area should not be included in the clear zone distance.
The calculated clear zone should encompass the usable shoulder and the area beyond the toe of a 3:1 slope.

Source of table values: 2002 ITD Design Manual, Appendix C, Section C.2.11, Fig. C-2. (Table and illustration not taken directly from ITD Design Manual, but constructed using values from table in manual).

Figure 32
Typical Two-Lane Cross-Section

DKS Associates



Some of the improvements listed in the table are not located directly on US 89, but on adjacent local facilities. Therefore, these improvements would have to be implemented by local highway jurisdictions or as state-local partnerships.

To more clearly discuss the recommended improvements, the table was broken down by corridor segment and time frame, starting at the Utah state line and ending in Montpelier:

- Segment 1 – Utah State Line to Minnetonka Cave Rd. (M.P. 0.00 – M.P. 8.93)
- Segment 2 – Minnetonka Cave Rd. to Paris S. City Limits (M.P. 8.93 – M.P. 14.95)
- Segment 3 – Paris S. City Limits to Ovid Corner (M.P. 14.95 – M.P. 20.23)
- Segment 4 – Ovid Corner – Montpelier E. City Limit (M.P. 20.23 – M.P. 27.17)

The recommended improvements within each segment are described in the sections below.

Segment 1 – Utah State Line to Minnetonka Cave Rd.

Within Segment 1, improvements are recommended to address existing deficiencies along several sections of US 89. Between the Utah state line and south of St. Charles (M.P. 0.00 – M.P. 6.83), shoulder widening is recommended to increase the existing substandard shoulder widths to 6 feet. This improvement would also help mitigate the problem of vehicles parked on the roadway at locations south of Fish Haven due to the lack of lake access parking. The widening could be done within the existing right-of-way along the entire section, although in certain areas this may need to be done on the west of the highway only because of lakeshore constraints on the east side, requiring realignment. Because of the cost, this improvement would most likely be done over time in conjunction with other improvements.

With regard to the parking problem along the lake, the construction of parking areas off of the highway was also considered as an option. No potential sites where property-taking would not be required were found on the east side of US 89, however. Although sites were identified on west side of the highway, this would not be desirable because of the need for lake-users to walk across the highway to access the lake and the planned shared-use pathway identified in the *US 89 Pathway Reconnaissance Study*.[61]

Between the Utah state line and the north end of Fish Haven, another existing deficiency is conflicts between turning vehicles and through traffic along US 89. A continuous two-way center turn lane is recommended to address this deficiency between Fish Haven Creek and the north end of Fish Haven (M.P. 2.58 – M.P. 3.09). A conceptual drawing of this improvement is shown in Figure 34. It would also eliminate the future level of service deficiency identified along this section of US 89. Widening of the highway to four lanes was also considered for this segment, but was not selected because the

[61] Idaho Tranaportation Department, US 89 Pathway Reconnaissance Study, (2005).

Figure 34
Example Two-Way Center Turn Lane in Fish Haven
Fish Haven Creek to N. Fish Haven

continuous two-way center turn lane option would have lower right-of-way needs, lower capital costs, and less environmental impact, while providing a higher level of safety by removing all left-turning vehicles from the traffic stream.

Potential impacts associated with the two-way center turn lane are encroachment impacts to the Scofield house (an historic resource) and environmental impacts to Fish Haven Creek, where the existing crossing would have to be replaced to allow for fish passage. This is considered to be a positive impact, however, due to the current degraded condition of the stream.

In addition to the continuous two-way center turn lane, a northbound left-turn lane is recommended at Fish Haven Canyon Rd., as well as a southbound right-turn lane (long-range improvement). All of the locations where turn lanes are recommended meet ITD's turn lane warrants, as described in Section III.

To reduce existing traffic conflicts to the south of Fish Haven Creek, turn lanes are recommended at Lake West Blvd. (northbound left-turn lane and southbound right-turn lane) and Loveland Ln. (southbound right-turn lane). Example drawings of the left-turn lane at Lake West Blvd. and right-turn lane at Loveland Ln. are shown in Figures 35 and 36. An additional long-range improvement would be the construction of a northbound left-turn lane at Loveland Ln.

Frontage roads were also considered as an option for reducing traffic conflicts between the Utah state line and the north end of Fish Haven. Existing driveways along US 89 would have access to the frontage roads rather than directly onto US 89, thereby reducing the number of conflict points along the highway. Several potential locations for frontage roads were identified on both the east and west sides of US 89 within this section. This improvement option was not selected, however, for the following reasons:

- Potential need for property-taking.
- Difficulty of vehicles towing boats or trailers in making tight turns at accesses from frontage roads to US 89.
- Possible need to construct retaining walls due to grades on east and west sides of US 89.
- Frontage roads may be used as "linear parking lots" rather than local access roads.
- Uncertainty about responsibility for maintenance.

An alternative to the improvements described above that was suggested at public open house meetings was the construction of a bypass route to the west of the Fish Haven area and extending south, reconnecting with US 89 to the south of the Utah state line. One proposed alignment for this route was Green Canyon Rd., which extends westward from US 89 in St. Charles. From Green Canyon Rd., the bypass would follow Beaver Creek Rd. south to below the Utah state line. Here, the bypass would reconnect with US 89 via Utah State Route 243. The total length of this alignment would be roughly 16.5 miles, with 13.5 miles in the Idaho portion. The purpose of the bypass would be to serve

Figure 35
Example Left Turn Lane at Lake West Boulevard

Figure 36
Example Right Turn Lane at Loveland Lane

through traffic, with the existing section of US 89 serving primarily local traffic and traffic destined for Bear Lake.

This alternative was considered infeasible, however, for the following reasons:

- Extremely high construction cost. The cost for a similar 10-mile bypass improvement along US 30 west of Lava Hot Springs has been estimated at $75M. Based on this, a rough cost estimate for the Fish Haven bypass would be $125M ($100M for the Idaho segment).
- Major environmental impacts.
- Substantial property-taking that would be required.
- Low likelihood of implementation. For example, the Utah Department of Transportation has indicated that the construction of the Utah segment of the bypass would be very unlikely.[62]
- Lack of an identified short-range or long-range need for an improvement of this magnitude. The improvements described above would likely address a significant portion of the existing and future needs along this section of US 89.

Several other road improvements are recommended between the Utah state line and the north end of Fish Haven. These are:

- <u>Improvements to minor road approaches.</u> At several intersections along US 89, improvements are needed to the minor road to raise the approach grade and/or widen the approach lane width. These locations are listed in Appendix F.
- <u>Vehicle turnaround at Utah state line.</u> Currently, snow plows and school buses must back up onto the highway in order to turn around, which is an illegal maneuver for school buses. A vehicle turnaround is recommended on the west side of the highway. This improvement would require only a minor property acquisition.
- <u>Provision of scenic pull-outs.</u> Several potential sites near the lake on the east side of the highway were identified in a preliminary review, but the determination of the most appropriate locations will require a detailed assessment of environmental impacts. Numerous sites may also be available on the west side of US 89, if needed.
- <u>Removal of parking at Fish Haven Canyon Rd.</u> Vehicles parked on the north and south sides of the intersection limit the sight distance for drivers attempting to turn onto US 89 from the eastbound approach of Fish Haven Canyon Rd. The removal of parking in these areas would eliminate this problem.

Bicycle and pedestrian facilities are also recommended, particularly to serve the higher volumes of recreational activity in the Fish Haven area during the peak summer months.

[62] Rex Harris, Utah Dept. of Transportation, US 89 Corridor Study Task Force Meeting, 7/1/03.

The *US 89 Pathway Reconnaissance Study*[63] recommends that a shared-use path should be constructed on the west side of US 89 between the Utah state line and Minnetonka Cave Rd.

Additional pedestrian facilities are recommended in the middle of Fish Haven near Fish Haven Canyon Rd., consistent with the higher pedestrian volumes in the area and ITD's policy regarding the provision of pedestrian facilities in recreational areas, as described in Section III. These would include a multi–use path on the south side of Fish Haven Canyon Rd. to serve existing and future recreational housing to the west. In conjunction with the recommended northbound left-turn lane at the Fish Haven Canyon Rd. intersection, a pedestrian refuge should also be constructed on the north side of the intersection, together with a striped crosswalk and advance pedestrian signing along US 89.

To the north of Fish Haven, the only roadway improvements are at Fish Haven Cemetery Rd., where construction of a southbound right-turn lane over the long-range time period and widening of the approach lane on Fish Haven Cemetery Rd. are recommended.

No improvements are recommended within St. Charles because no deficiencies were identified. To the north of St. Charles, however, between North Beach Rd. and Minnetonka Cave Rd., several improvements are recommended. At North Beach Rd., these are a northbound right-turn lane and a southbound left-turn lane. Construction of the southbound left-turn lane would require widening of the bridge at N. St. Charles Creek, resulting in environmental impacts to the creek. The widened bridge would need to allow for fish passage, with additional mitigation required to restore/enhance the riparian corridor in the disturbance area. At Minnetonka Cave Rd., a northbound left-turn lane and southbound right-turn lane are recommended.

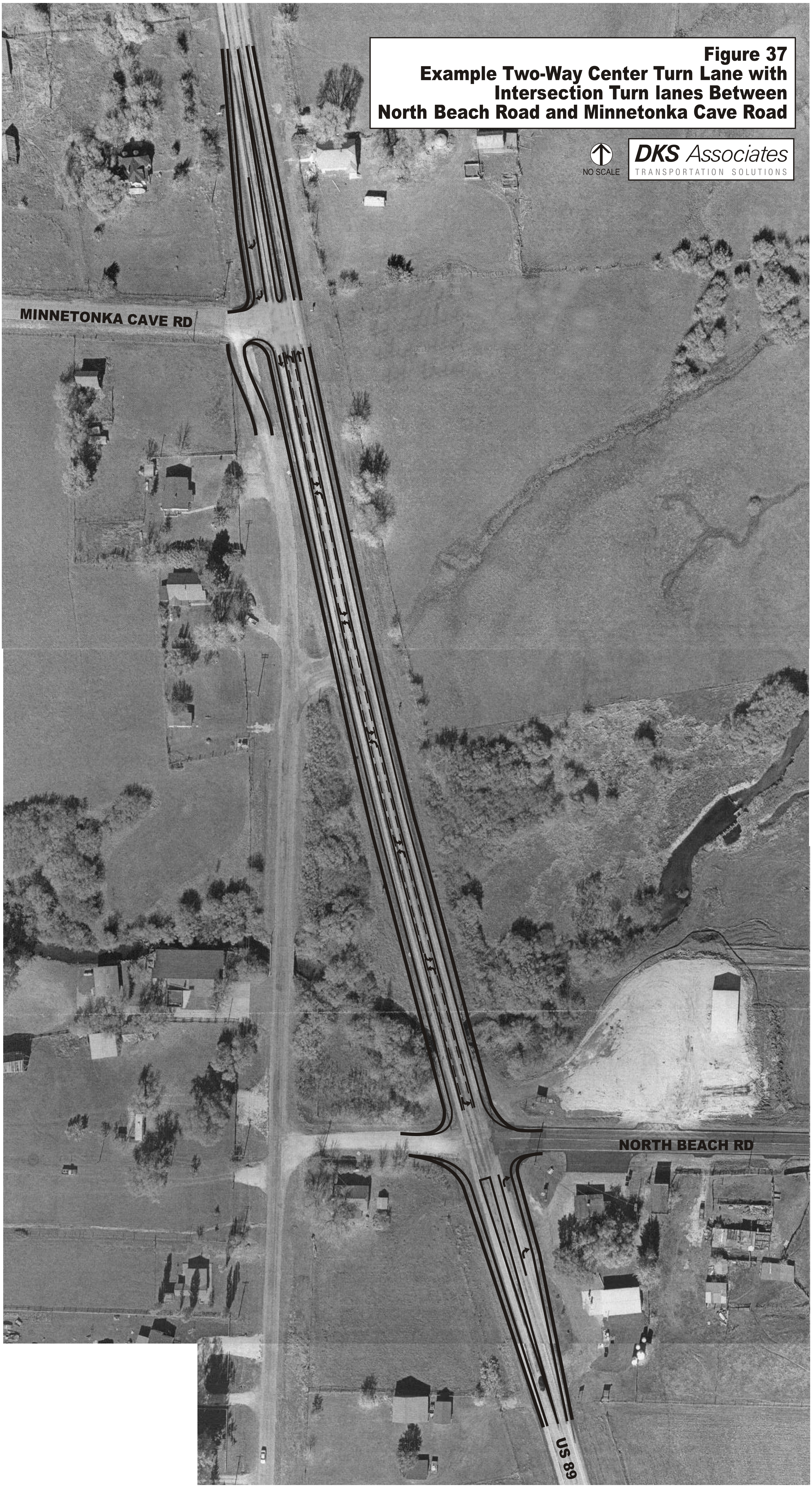
In addition to the turn lanes, a continuous two-way center turn lane should be constructed between North Beach Rd. and Minnetonka Cave Rd., because the southbound left-turn lane at North Beach Rd. and the northbound left-turn lane at Minnetonka Cave Rd. would be nearly back-to-back if constructed separately. A conceptual drawing of this improvement, together with the turn lanes, is shown in Figure 37.

Segment 2 – Minnetonka Cave Rd. to Paris S. City Limits

Only two roadway improvements are recommended within this segment to address existing deficiencies at Bloomington Canyon Rd. These are the construction of a southbound right-turn lane and widening of the approach lanes on Bloomington Canyon Rd.

[63] Idaho Tranaportation Department, US 89 Pathway Reconnaissance Study, (2005).

Figure 37
Example Two-Way Center Turn Lane with Intersection Turn lanes Between North Beach Road and Minnetonka Cave Road



Segment 3 – Paris S. City Limits to Ovid Corner

Within Paris, the only recommended improvements are the installation of northbound and southbound right-turn lanes at E. 2nd North St. over the long-range time period. To the north of Paris between E. 2nd North St. and Ovid Corner, the shoulders should be widened to 10 feet to address the general problem of conflicts between traffic and farm vehicles and livestock that occur at various points along this section. Another option that was considered to address this problem was single-lane frontage roads on both sides of the highway. Although the frontage roads could be constructed within the existing right-of-way, there would still be several impacts associated with this improvement:

- Large amount of fill would be required for the borrow pits adjacent to the highway.
- Potential wetland impacts.
- Potential impacts to property owners who have built garages and outbuildings along the right-of-way line and who use the right-of-way for maneuvering and parking.
- Impacts to Ovid creek due to the required widening of two structures over the creek.

In addition, the cost of the frontage roads would be significantly higher than that of the shoulder widening. Therefore, shoulder widening was identified as the recommended option. This improvement would obviously also address the shoulder width deficiency identified between Lanark Rd. and Ovid Corner.

At Church Farm Rd. and Wallentine Rd., intersection sight distance and stopping sight distance deficiencies are caused by a vertical curve located between the two intersections. Here, the recommended improvement would be to decrease the vertical curve. The amount of decrease required to achieve adequate sight distance would likely be minor. Relocating the two existing intersections at a new combined intersection at the crest of the curve was also considered, but this would require property-taking and the cost would likely be higher than that of lowering the curve.

A similar problem exists to the north at Lanark Rd., where a vertical curve at the intersection limits the ability of northbound drivers to adequately see oncoming southbound traffic when attempting to turn left onto Lanark Rd. This problem is worsened by the need for a northbound left-turn lane. Reducing the curve by either lowering its height or filling the bottom is recommended, together with the construction of a northbound left-turn lane. The amount of reduction would likely be minor.

Between Lanark Rd. and Ovid Corner, a level of service deficiency exists, primarily due to the higher frequency of no-passing zones. To achieve an adequate level of service, the construction of passing lanes is recommended, preferably between Lanark Rd. and just south of Ovid Creek. This location is preferred in order to avoid widening of the Ovid Creek Bridge any further than is necessary (see description of this improvement below).

The passing lanes would alternate by direction, so that a passing lane would be added/ended in one direction first, followed by a short two-lane section, and then a second passing lane would be added/ended in the other direction. Each passing lane would be roughly .7 miles in length, including tapers. Although the passing lanes could be constructed within the existing right-of-way, together with the shoulder widening improvement described above, there could be several potential impacts. These include impacts to an adjacent wetland area at M.P. 19.2 that would require mitigation and impacts to property owners who have built garages and outbuildings along the right-of-way line and who use the right-of-way for maneuvering and parking.

Another deficiency between Lanark Rd. and Ovid Corner is the difficult winter driving conditions caused by blowing and drifting snow. Two approaches for addressing this problem would be the installation of roadside snow fences and implementation of a Road Weather Information System (RWIS). The snow fences could be either permanent or temporary structural barriers or living snow fences, which are designed plantings of trees and/or shrubs and native grasses along roads. ITD has successfully used portable snow fences at other locations, such as along SH-37 between American Falls and Rockland. The RWIS would include a roadside sensor station integrated with dynamic message signs and other advance traveler information devices to warn drivers if there are poor driving conditions ahead.

The Ovid Creek Bridge at M.P. 19.84 should be widened to meet ITD's bridge width standard. Although the standard for this bridge calls for the width to be equal to the width of the approach lanes plus 4-feet on either side, it is recommended that it be widened to 6-feet on either side in case future traffic volumes are higher than the forecast volumes.

There are multiple existing deficiencies at Ovid Corner. At the intersection of US 89/US 89 connector (south intersection) these are:

- Intersection sight distance for southbound right-turns does not meet ITD's standard due to horizontal curve.
- Northbound left-turn lane is needed (ITD's turn lane warrant is met).

At the US 89/SH-36 intersection, the deficiencies are:

- Intersection sight distance for eastbound left-turns does not meet ITD's standard due to horizontal curve.
- Westbound/southbound right-turn lane is needed.
- Some drivers are unaware of stop sign on eastbound approach of SH-36.
- Drivers on eastbound approach of SH-36 have difficulty determining whether westbound/southbound vehicles are turning right or continuing along US 89.

In the *Ovid Corner Refinement Analysis Study,*[64] five improvement options were identified to mitigate these combined problems. They ranged from relatively simple, low-cost approaches to larger-scale improvements with higher costs and impacts:

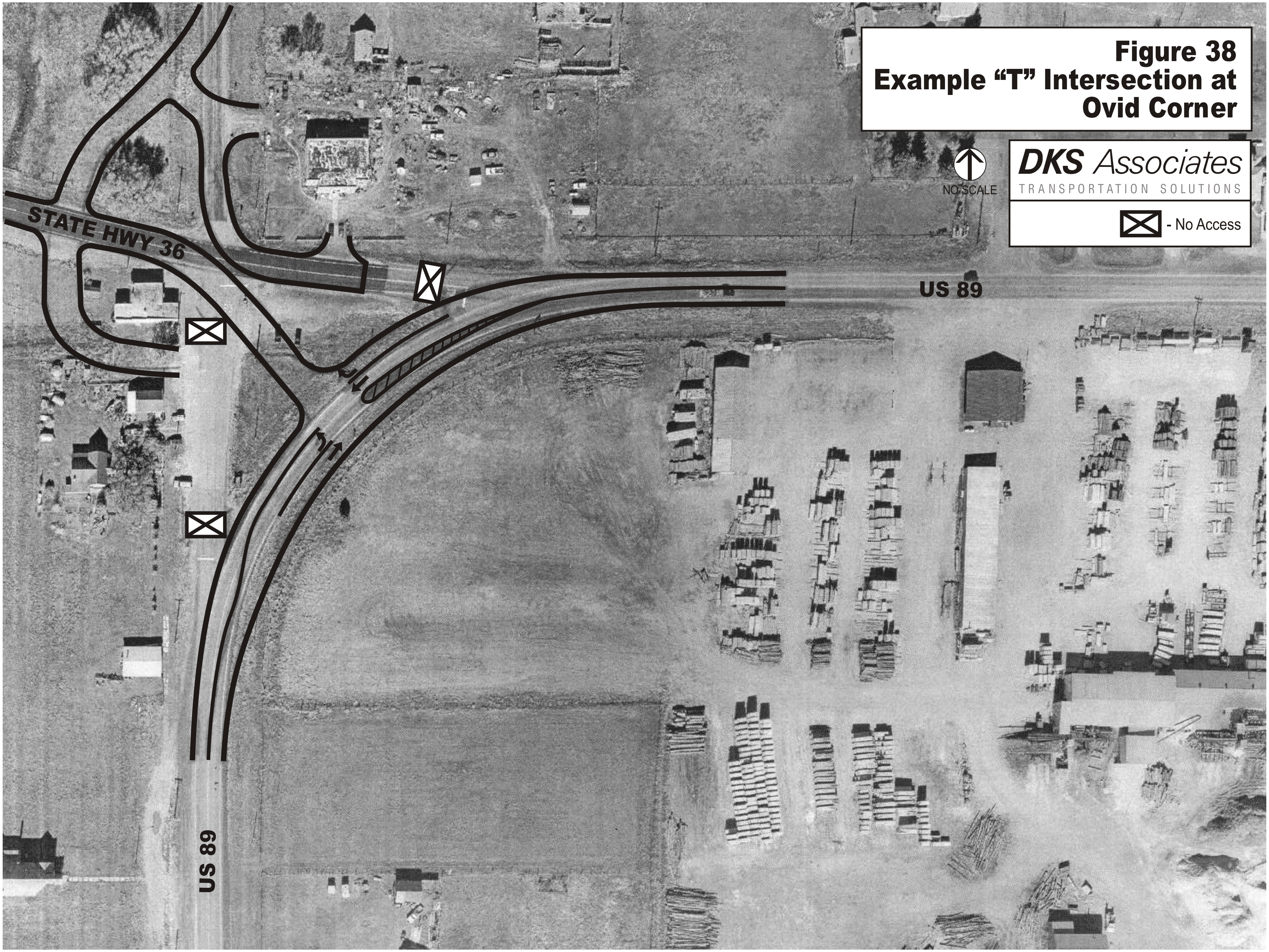
- Option 1 – Closure of Ovid Curve. Under this option, the existing triangle of roads formed by US 89 (Ovid Curve), SH-36, and the US-89 connector would be modified by the closure of Ovid Curve, with traffic rerouted along SH-36 and the US-89 connector.
- Option 2 – Construction of US 89/SH-36 "T" Intersection. This option would consist of closing the two existing intersections and replacing them with a new "T" intersection of US 89 and SH-36. It would involve the realignment of SH-36 so that it intersects US 89 at the mid-point of the Ovid Curve at roughly a 90-degree angle. This option would also include a northbound left-turn lane and a southbound right-turn lane at the new intersection. An example of a "T" intersection at this location is shown in Figure 38.
- Option 3 – Construction of Roundabout.. A rural, single-lane roundabout would replace the existing triangle of roads, with traffic along US 89 entering and exiting the roundabout from the south and east and traffic along SH-36 entering and exiting from the west. In order to stay within the current right-of-way, the design speed of the roundabout would be limited to 25 mph, resulting in a diameter of about 150-feet (see Figure 39).
- Option 4 – Construction of Grade-Separated Interchange. A grade-separated interchange would replace the existing triangle of roads, with SH-36 crossing over the top of US 89. Two sets of on/off-ramps would connect SH-36 with US 89 (see Figure 40).
- Option 5 – Construction of Bypass. US 89 would be realigned to the east of the lumber company located at Ovid Corner. This option would feature connections to SH-36 via the two existing sections of US 89 to the east and south of Ovid Corner, together with the closure of Ovid Curve. A roundabout would be constructed at the junction of each connector with US 89 (see Figure 41).

Also under Options 1-4, modifications to the local access from adjacent properties at Ovid Corner to SH-36 and the US 89 connector would be required.

Option 2 was selected for further study because it would effectively address the sight distance and other deficiencies described above and would have relatively low impacts and cost. Options 1 and 3 would also have relatively low impacts and cost. With Option 1, however, the disruption of US 89 traffic that would be caused by the reroute along SH-36 and the US 89 connector was considered unacceptable. Similarly with Option 3, the need to limit the design speed of the roundabout to 25 mph was considered to be too much of an impedance to through traffic along US 89. Several potential operational problems could also occur with at roundabout at this location, including drivers

[64] Idaho Transportation Department, Ovid Corner Refinement Analysis Study, (2005).

Figure 38
Example "T" Intersection at Ovid Corner



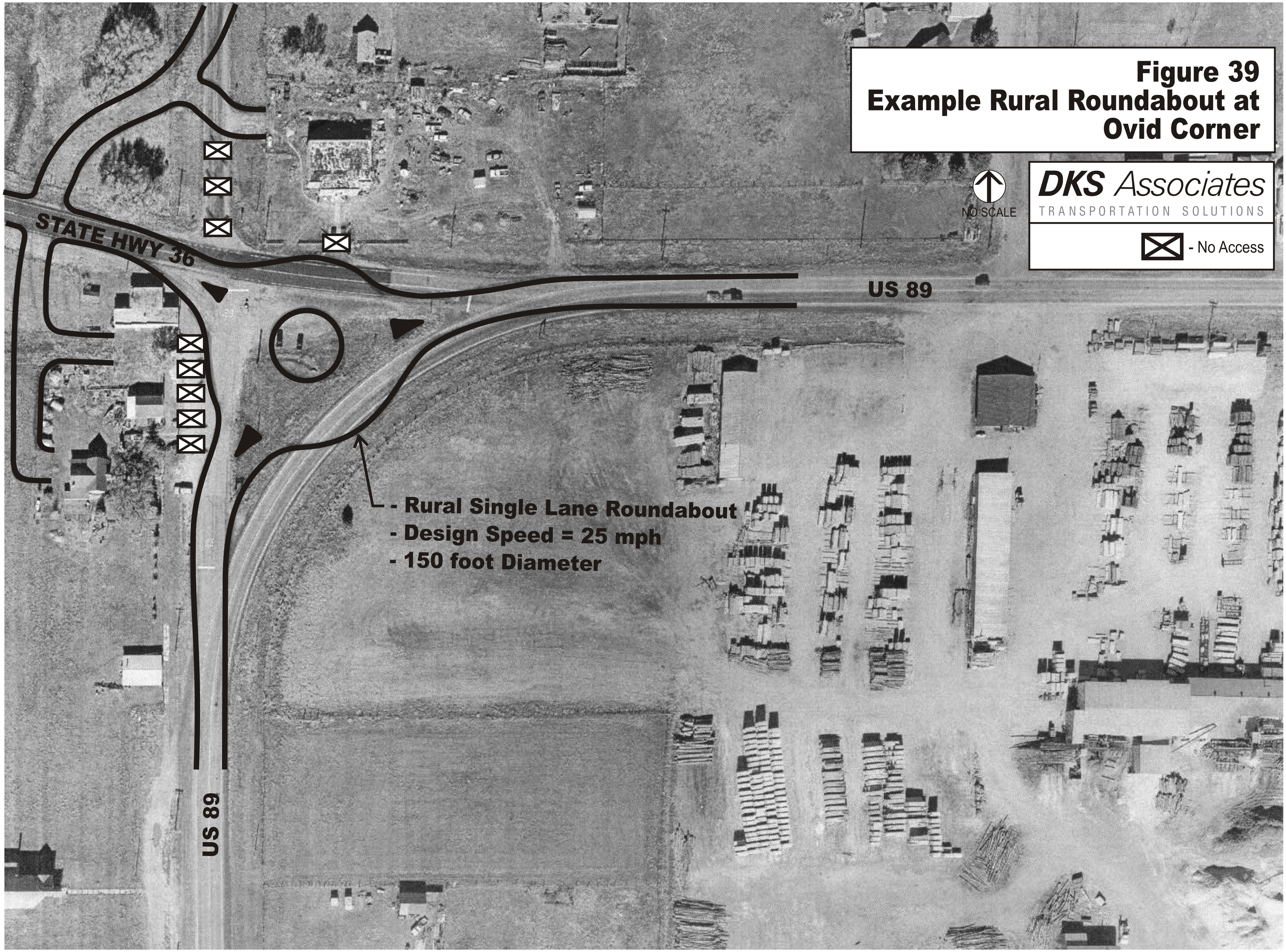


Figure 39
Example Rural Roundabout at
Ovid Corner
DKS Associates
TRANSPORTATION SOLUTIONS
NO SCALE
- No Access
STATE HWY 36
US 89
US 89
- Rural Single Lane Roundabout
- Design Speed = 25 mph
- 150 foot Diameter

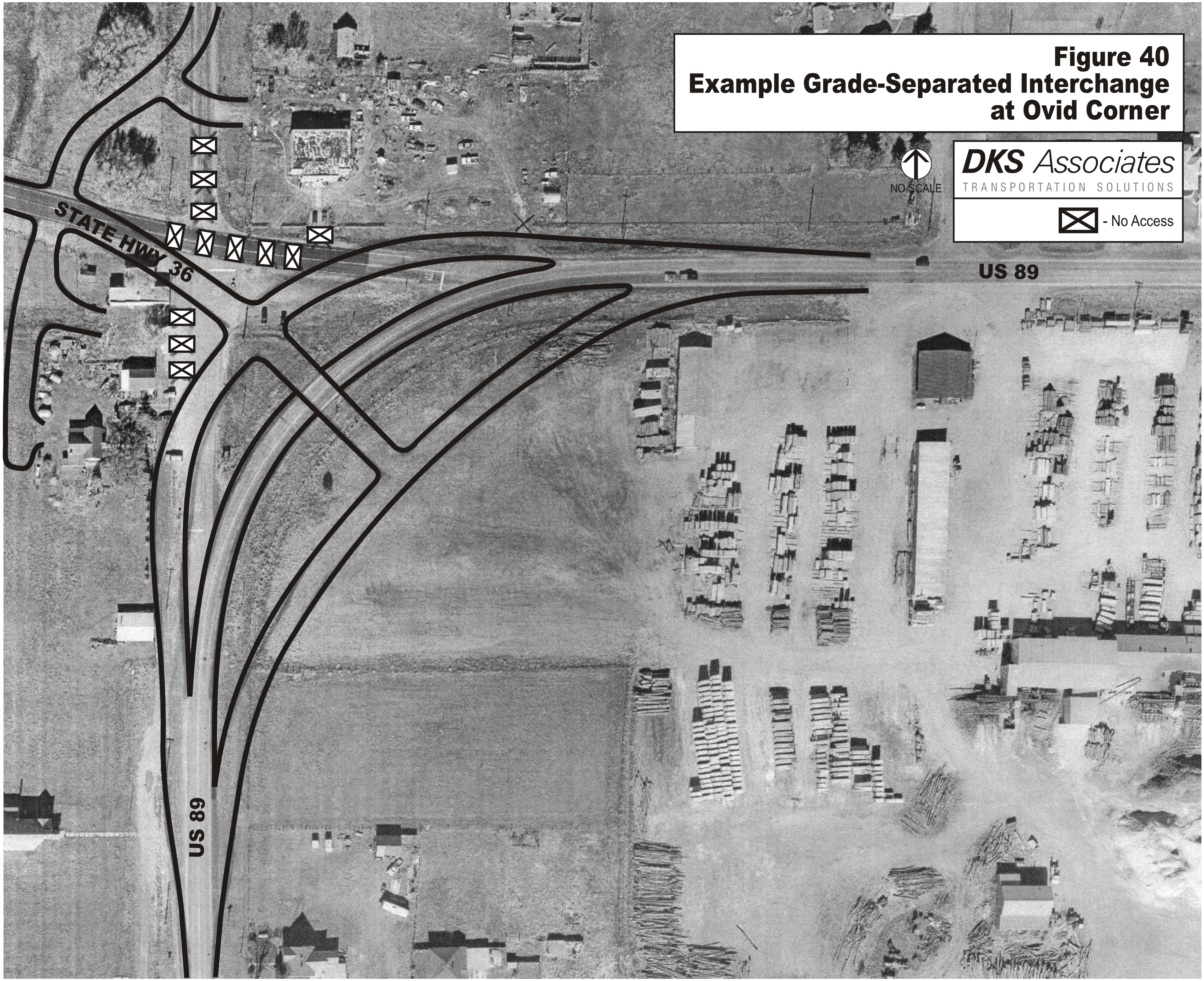
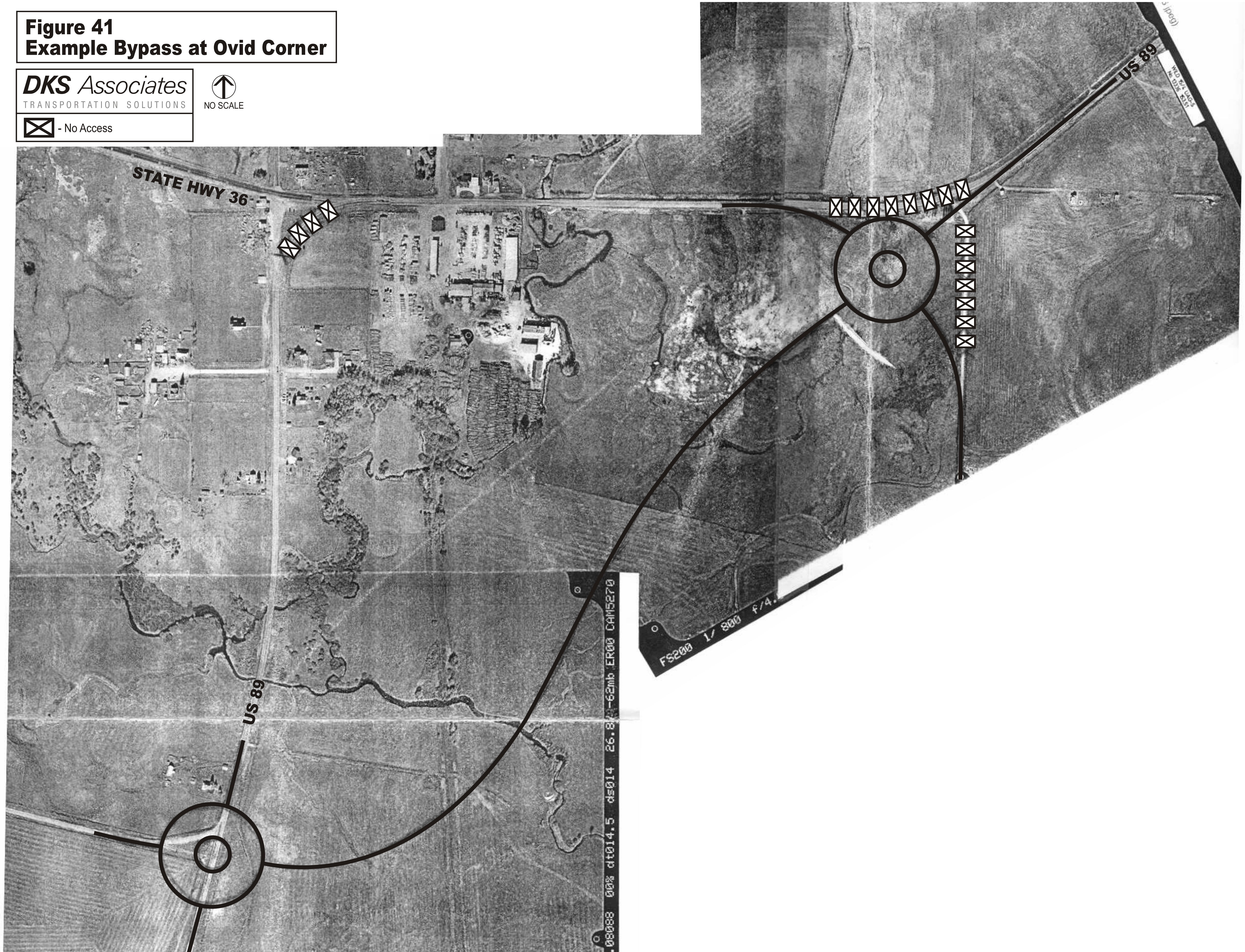


Figure 40
Example Grade-Separated Interchange
at Ovid Corner
DKS Associates
TRANSPORTATION SOLUTIONS
NO SCALE
- No Access
STATE HWY 36
US 89
US 89

Figure 41
Example Bypass at Ovid Corner



attempting to “cut the corner”, difficulties with snowplowing, and the general unfamiliarity of drivers with roundabouts.

Options 4 and 5 would likely be the most of effective in improving traffic operations and safety at Ovid Corner, as well as through traffic flow. With Option 4, the interchange would eliminate the current traffic conflicts at the two intersections by separating the through traffic along US 89 from the traffic to and from SH-36. With Option 5, traffic conditions would be improved by removing US 89 traffic from Ovid Corner altogether and rerouting it along the new alignment to east. These benefits would be outweighed, however, by the significant costs and impacts associated with both the interchange and bypass. With the interchange improvement, the impacts would be primarily to surrounding parcels, particularly encroachment impacts to the lumber company. The bypass would have substantial environmental impacts to the wetlands to the east of Ovid Corner.

OVID CORNER REFINEMENT ANALYSIS

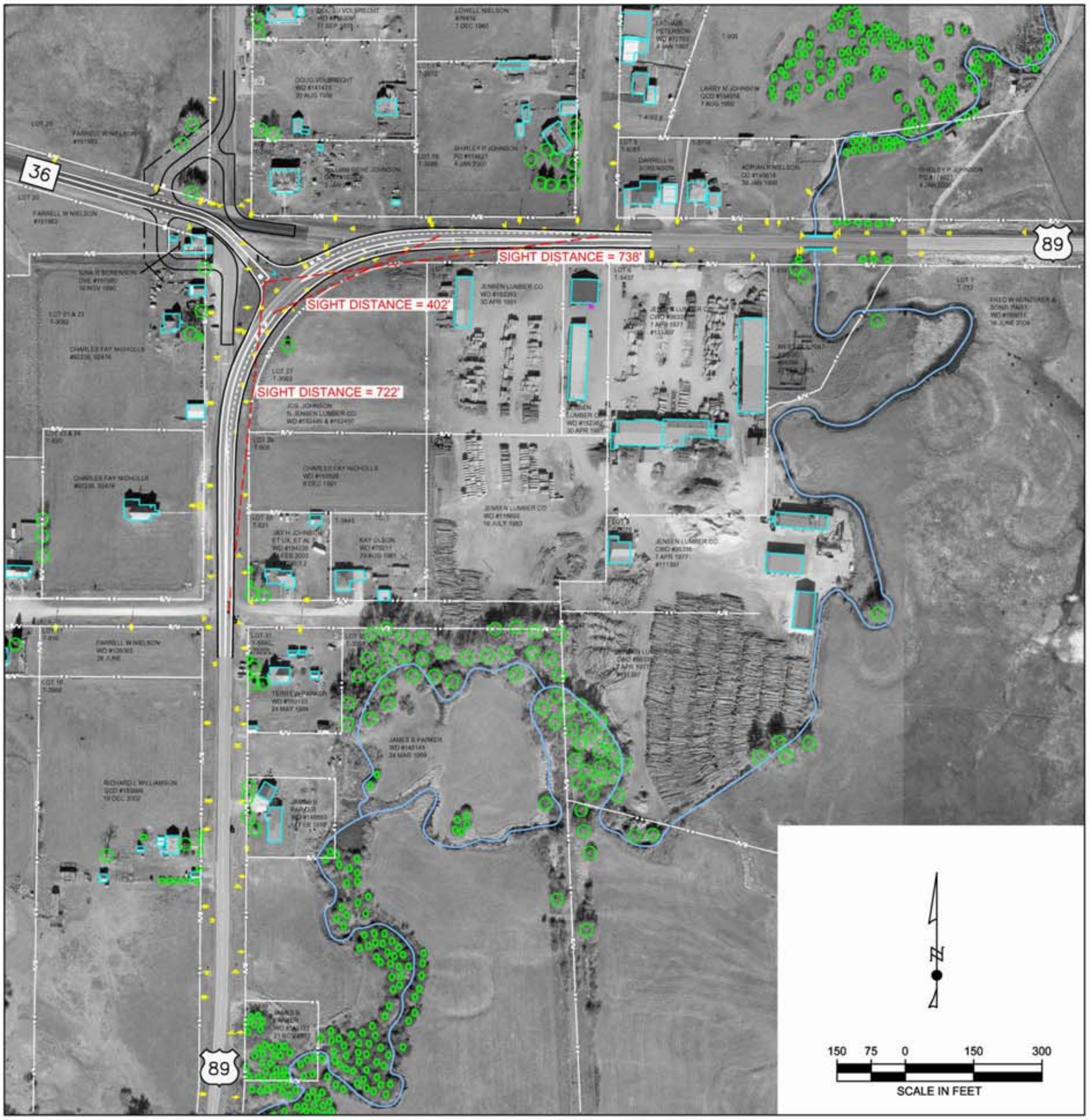
Once the “T” intersection option (Option 2) had been selected from the preliminary list of improvement options for Ovid Corner, a refinement analysis was conducted to identify in more detail the feasibility, impacts, benefits, and costs of this option. A significant factor influencing these issues is the assumed design speed for the curve along US 89. The design speed refers to the speed selected for purposes of design and correlation of the geometric features of a highway and is a measure of the quality of service offered by the highway. It is the highest continuous speed where individual vehicles can travel with safety upon a highway when weather conditions are favorable, traffic density is low and the geometric design features of the highway are the governing conditions for safe speed.

To determine the effects of the assumed design speed for this option, an expanded set of four “T”-intersection options was identified:

- 35-MPH Design Speed Option (Base Option)
- 45-MPH Design Speed Option
- 55-MPH Design Speed Option
- 65-MPH Design Speed Option

The 35-MPH Option, or Base Option, reflects the “T”-intersection improvement with the existing curve (see Figure 42), as described above. Each of the other options reflects this improvement together with the realignment of the existing curve at a higher design speed (see Figures 43 – 45).

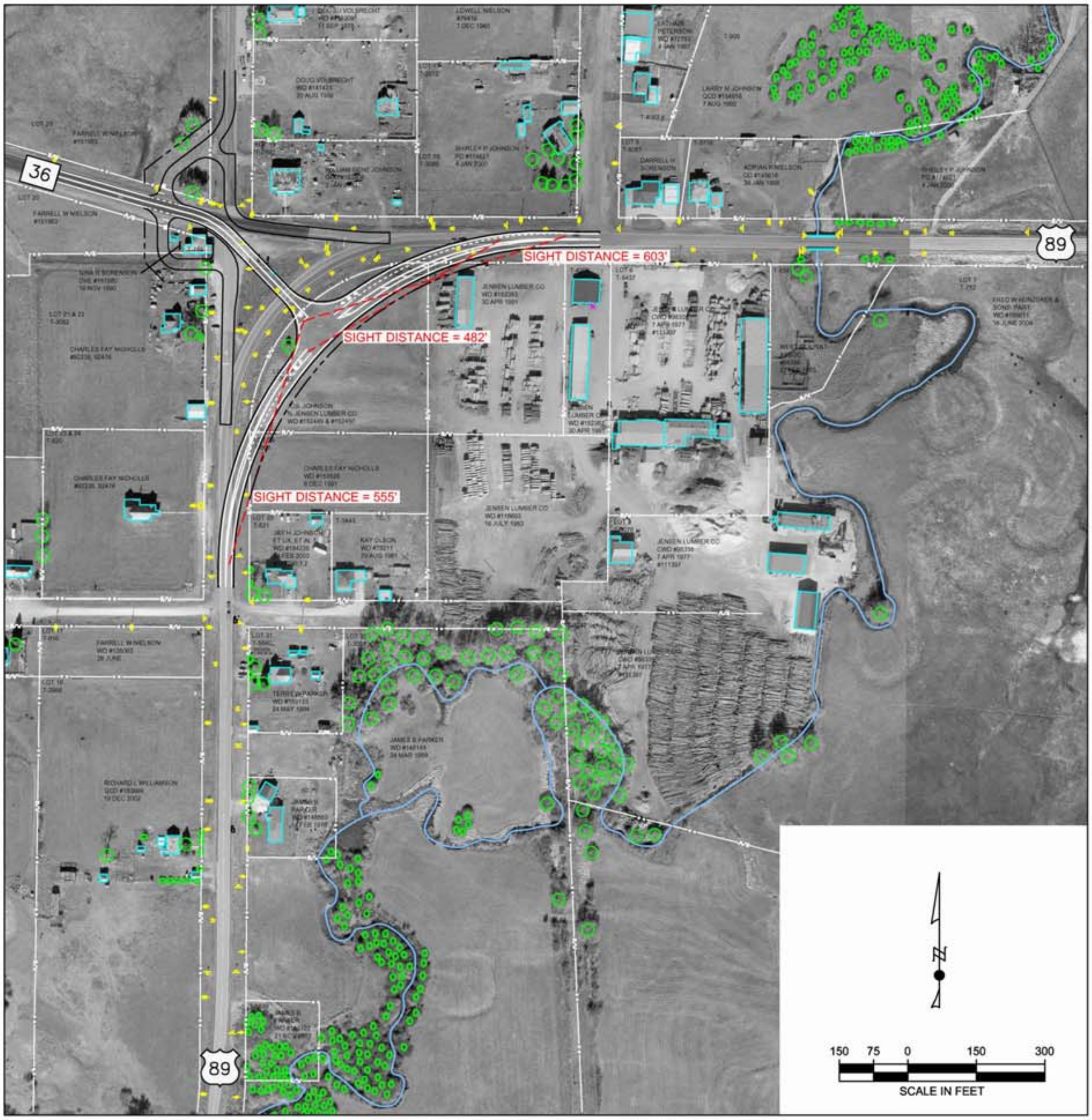
US HIGHWAY 89 CORRIDOR STUDY
OVID CORNER REFINEMENT ANALYSIS
PROJECT NO. NH-1530 (101)
KEY NO. 8450



Design Speed: 35 MPH
Minimum Curve Radius: 420 FT

Figure 42
35-MPH Design Speed Option (Base Option)

US HIGHWAY 89 CORRIDOR STUDY
OVID CORNER REFINEMENT ANALYSIS
PROJECT NO. NH-1530 (101)
KEY NO. 8450

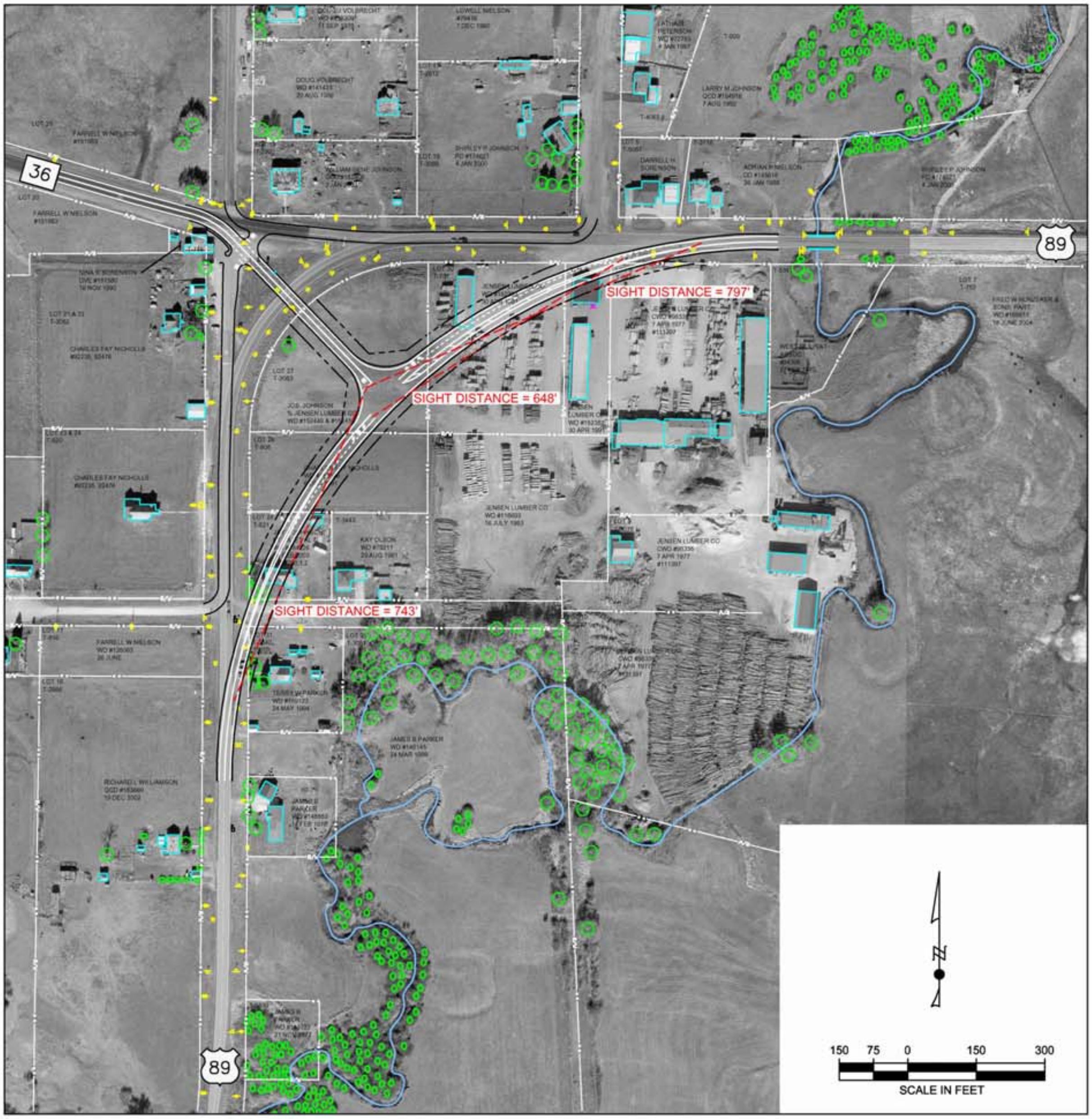


Design Speed: 45 MPH
Superelevation Rate: 4%
Minimum Curve Radius: 711 FT

Figure 43
45-MPH Design Speed Option

DKS Associates
TRANSPORTATION SOLUTIONS

US HIGHWAY 89 CORRIDOR STUDY
OVID CORNER REFINEMENT ANALYSIS
PROJECT NO. NH-1530 (101)
KEY NO. 8450

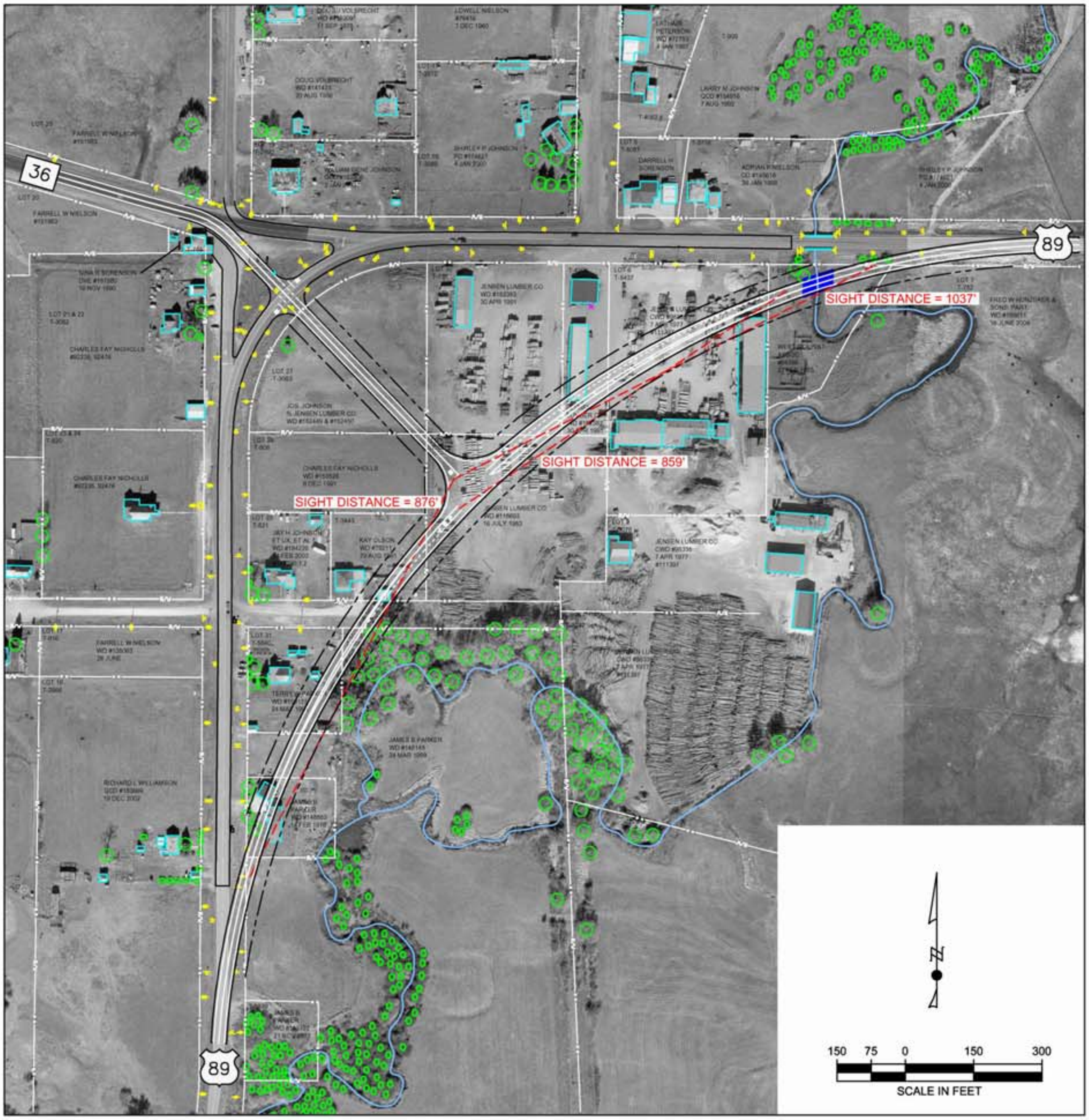


Design Speed: 55 MPH
Superelevation Rate: 4%
Minimum Curve Radius: 1190 FT

Figure 44
55-MPH Design Speed Option

DKS Associates
TRANSPORTATION SOLUTIONS

US HIGHWAY 89 CORRIDOR STUDY
OVID CORNER REFINEMENT ANALYSIS
PROJECT NO. NH-1530 (101)
KEY NO. 8450



Design Speed: 65 MPH
Superelevation Rate: 4%
Minimum Curve Radius: 1878 FT

Figure 45
65-MPH Design Speed Option

Evaluation of Ovid Corner Improvement Options

Impact Analysis

The impact analysis examined the land use impacts of each option to existing parcels within the project area and the associated right-of-way acquisition costs, as well as the impacts to wetland, historic, and cultural resources.

To conduct the land use impact analysis, each parcel within the project area was classified into one of four land use types: agricultural land, residential, lumber mill, or vacant/buildable. The Jensen Lumber Mill is the major land use in the area and covers multiple parcels, some of which have buildings, while others are vacant and used for log decks and the storage of lumber. Each parcel was then further classified based on the following two types of impacts:

- Encroachment, in which a minor portion of the parcel is affected that does not adversely impact the existing land uses on the balance of the property; and
- Displacement, in which a major portion of the parcel is affected that causes adverse impacts to the existing land uses on the property.

Right-of-way cost estimates were based on assessed value and appraisal information obtained from the Bear Lake County Assessor's Office.[65] Assessed values were increased by 20% to account for market factors and time delays in the appraisal process. Acquisition cost estimates were then determined for the four basic types of land uses.

Agricultural land values vary from $400 to $2,000 per acre, depending on the quality of the land, level of the water table, irrigation, etc. A detailed character analysis of each agricultural parcel was not undertaken because of the relatively minor impacts to agricultural land. For the cost estimates, an average agricultural land value of $1,500 per acre, or $0.034 per square foot, was used.

Residential land values were based on the total assessed value of the parcel (land plus improvements), plus the 20% market factor.

Jensen Lumber Mill land values were based on the assessed values of the land and building components. The land value was based on the average for the seven parcels that make up the site, calculated as $2,400 per acre or $0.055 per square foot. Land value was used to determine the cost of encroachments or displacement of the vacant (log deck) parcels. Where the impact area would involve a structure, the cost was based on the assessed value of the improvements (plus 20%).

[65] Telephone conversation with Lynn Lewis, Bear Lake County Assessor's Office.

Vacant or Buildable land values were based on the average land value for the Jensen Lumber mill, calculated as $2,400 per acre or $0.055 per square foot. Land value was used to determine the cost of encroachments or displacement of vacant parcels and the County right-of-way.

A flat-rate charge of $4,000 per parcel was also assumed to cover transaction costs (surveys, title report, appraisals, etc.)

The configuration of the improvement options could also create new or residual parcels that could be sold as surplus land to offset land acquisition costs. These parcels were factored into the cost analysis for each option.

Wetland impacts were assessed using US Fish and Wildlife Service National Wetlands Inventory (Maps). High-resolution aerial photography also helped to identify parcel level impacts. No historic or cultural resources were identified in the project area (see previous Environmental Scan section).

The 35-MPH Option would impact parcels on either side of the new SH-36 alignment, with right-of-way acquisition for new local access roads to replace the existing approaches (see Figure 46). There would be no wetland impacts with this option, nor residual parcels. The estimated right-of-way acquisition cost for this option would be $68,500.

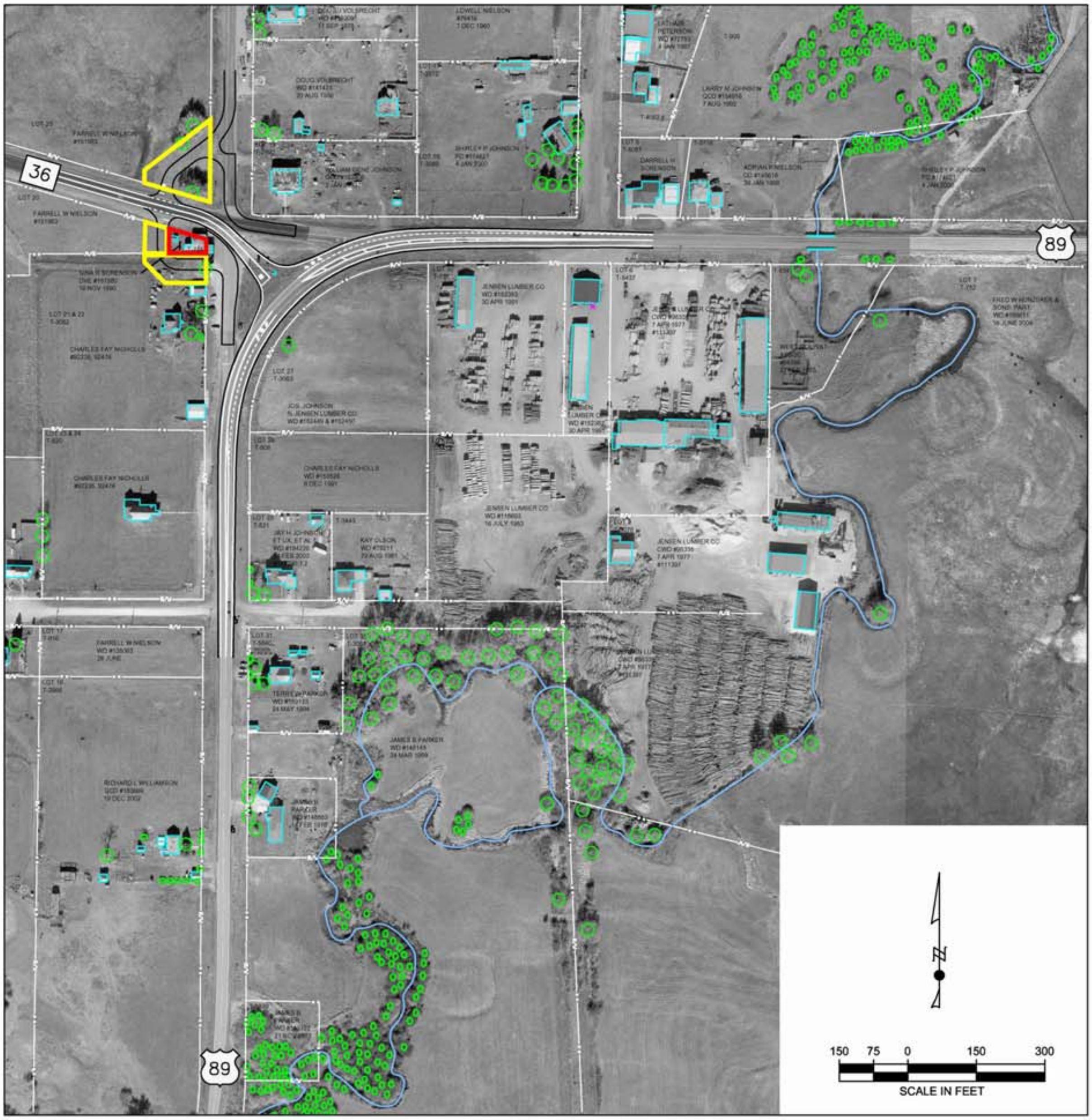
The same type of land use impacts associated with the new SH-36 alignment would occur with the 45-MPH Option (see Figure 47). In addition, the new alignment of US 89 would encroach on the log deck of the Jensen Lumber site, and the sight distance for the existing driveway would be inadequate, so that it would need to be shifted 150-200 feet to the east. There would be no wetland impacts with this option. The estimated right-of-way cost for this option would be roughly $83,000, but this could be partially offset by two small residual parcels that would be created with the configuration of the new SH-36 intersection. The estimated value of these parcels is $2,500.

There would be no land use impacts related to the new SH-36 alignment with the 55-MPH Option (see Figure 48). The Jensen Lumber site would be impacted by the displacement of one log deck parcel (2.61 acres) and portions of two other parcels with two structures. It is assumed that the mill could continue to operate with this option. The mill's access point to US 89 would need to be relocated, most likely opposite the new SH-36 alignment. There are no wetland impacts with this option. The estimated right-of-way cost for this option would be $123,000. Four residual parcels would be created with this option, having an estimated value of $11,000, that could be developed using the new access roads to SH-36.

The 65-MPH Option would also not impact parcels on either side of the new SH-36 alignment (see Figure 49). Although it appears that the main mill buildings of the Jensen Lumber site would remain intact, the site as a whole would be split in half by the new alignment and was therefore considered to be displaced. The existing access point to US

DKS Associates
TRANSPORTATION SOLUTIONS

US HIGHWAY 89 CORRIDOR STUDY
OVID CORNER REFINEMENT ANALYSIS
PROJECT NO. NH-1530 (101)
KEY NO. 8450

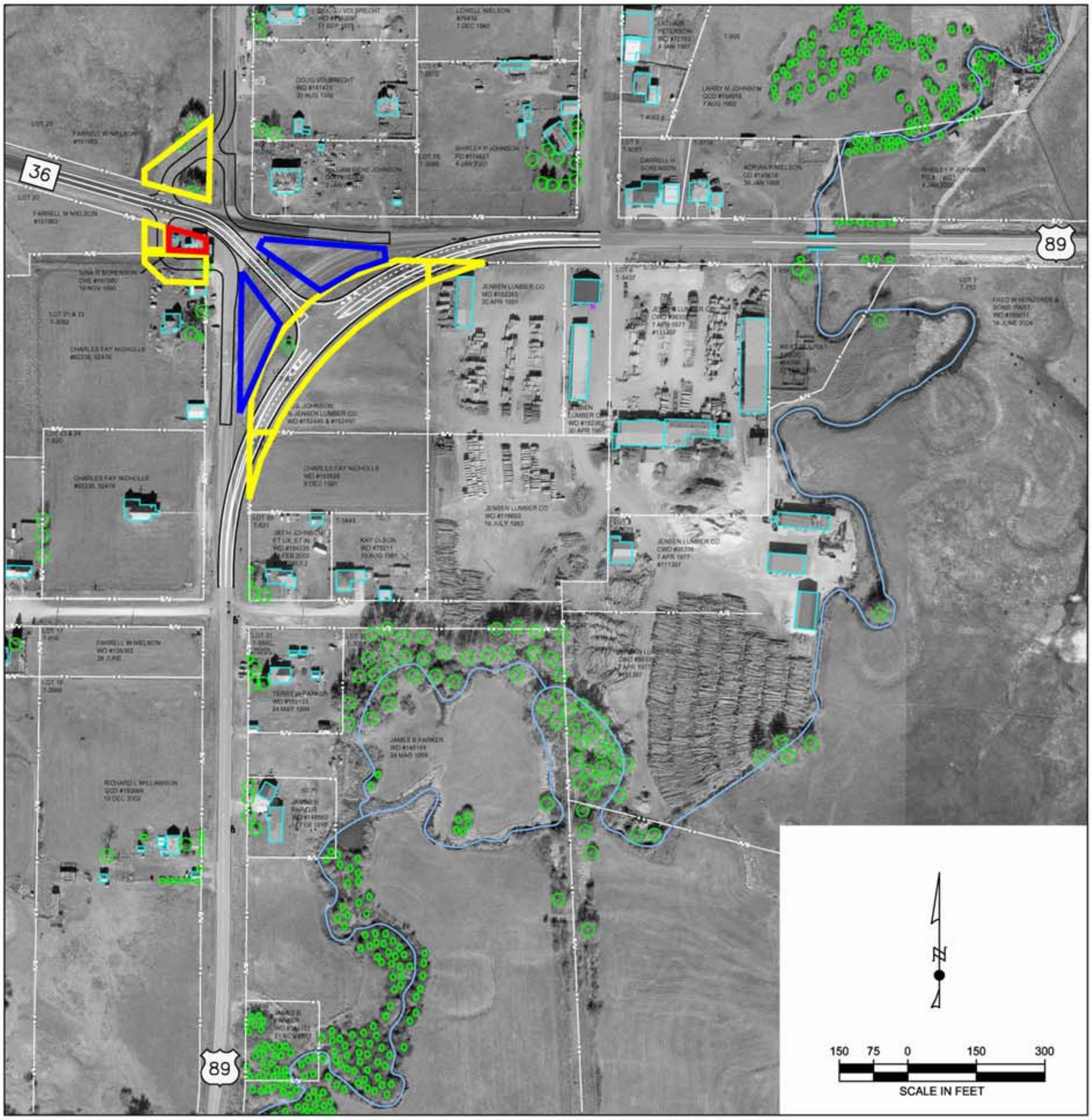


Encroachment
Displacement
Residual

Figure 46
Land Use Impacts of 35-MPH Option

DKS *Associates*
TRANSPORTATION SOLUTIONS

US HIGHWAY 89 CORRIDOR STUDY
OVID CORNER REFINEMENT ANALYSIS
PROJECT NO. NH-1530 (101)
KEY NO. 8450

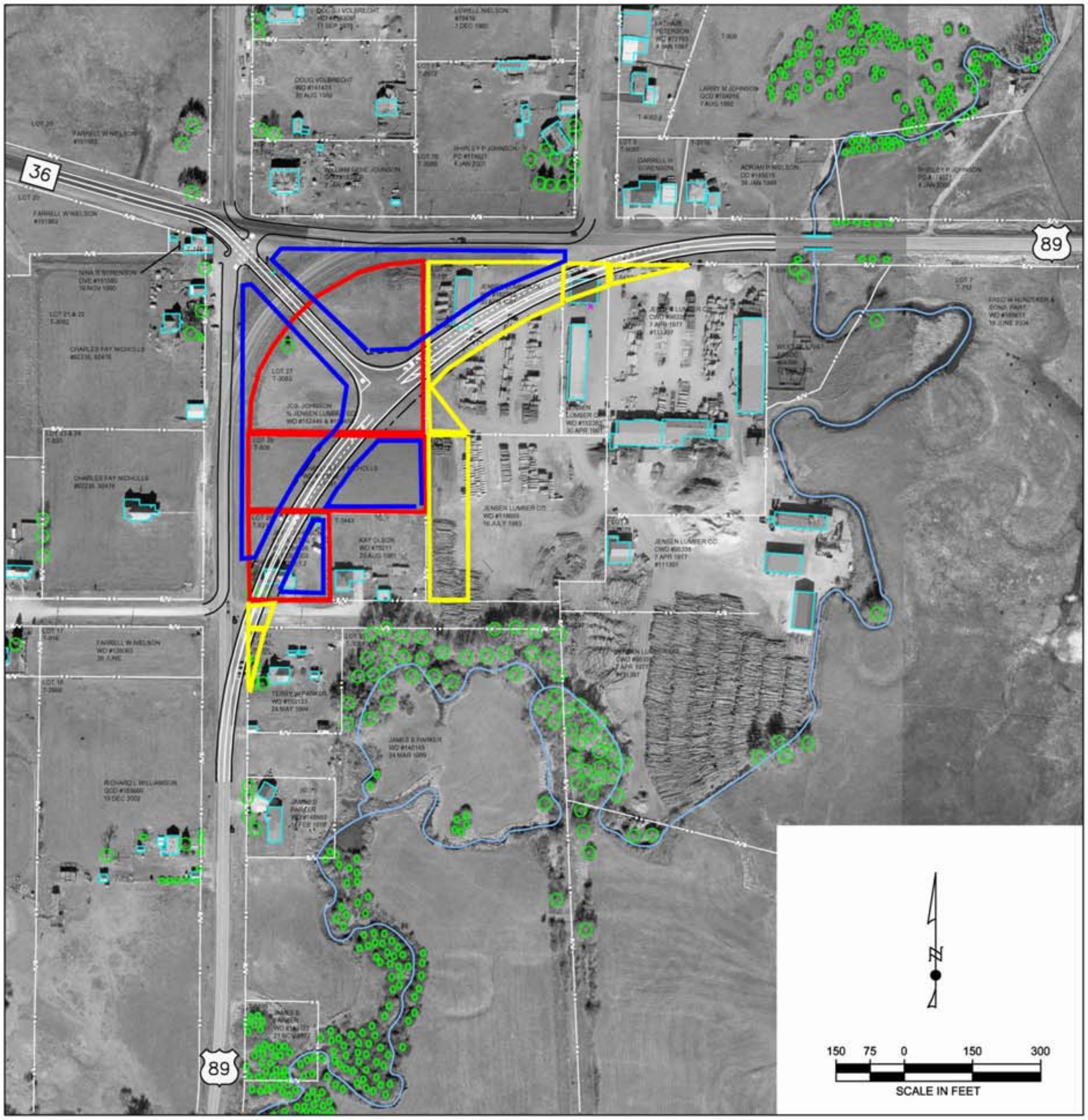


Encroachment
Displacement
Residual

Figure 47
Land Use Impacts of 45-MPH Option

DKS Associates
TRANSPORTATION SOLUTIONS

US HIGHWAY 89 CORRIDOR STUDY
OVID CORNER REFINEMENT ANALYSIS
PROJECT NO. NH-1530 (101)
KEY NO. 8450



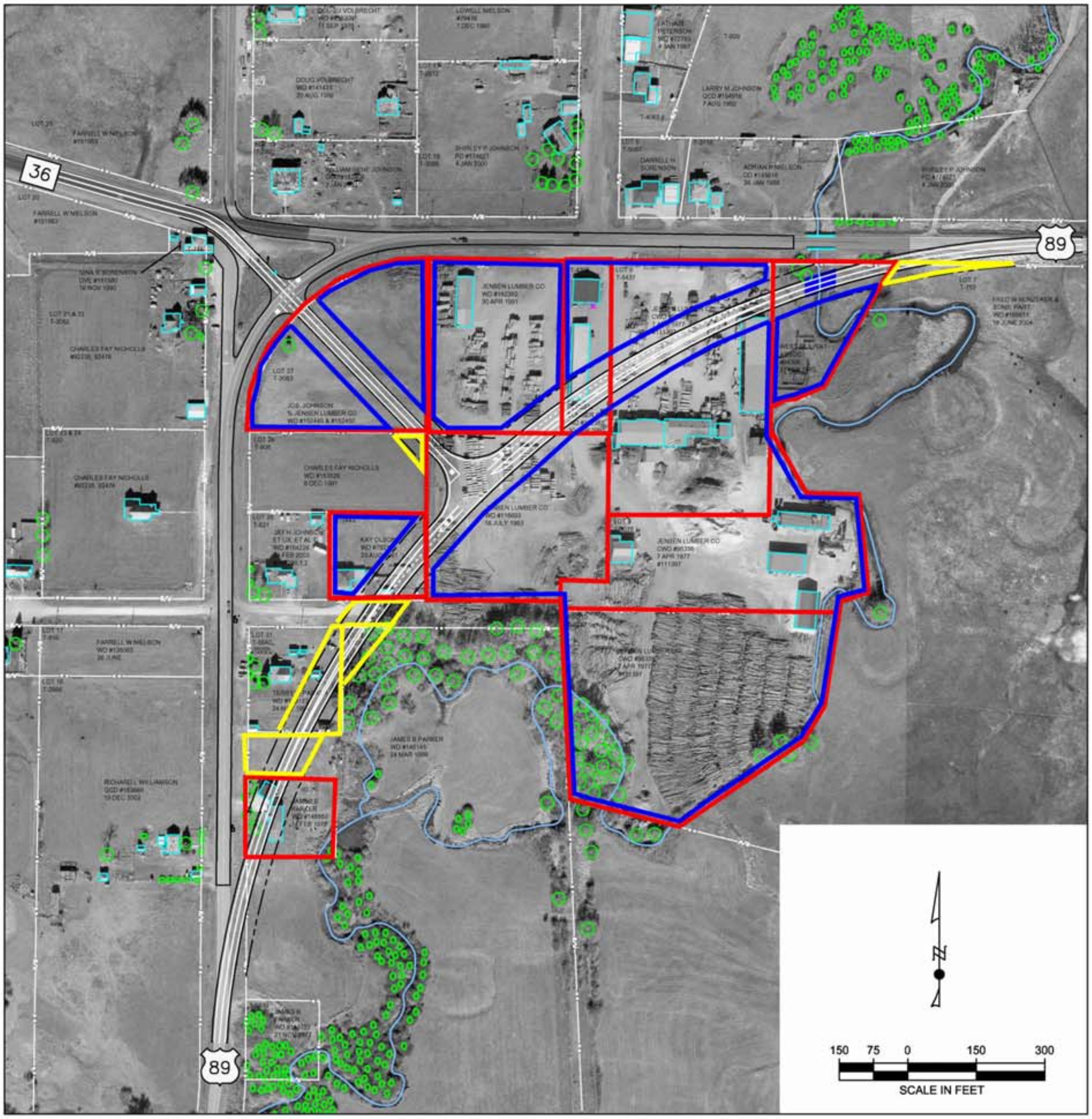
Encroachment
Displacement
Residual

Figure 48
Land Use Impacts of 55-MPH Option

DKS Associates

TRANSPORTATION SOLUTIONS

US HIGHWAY 89 CORRIDOR STUDY
OVID CORNER REFINEMENT ANALYSIS
PROJECT NO. NH-1530 (101)
KEY NO. 8450



Encroachment
Displacement
Residual

Figure 49
Land Use Impacts of 65-MPH Option

89 would need to be relocated for the residual parcel created by the displacement, most likely opposite the new SH-36 alignment. Two wetland sites would be impacted with this option. These are a small portion of a parcel to the south of the new SH-36 intersection roughly 15,000 square feet in size and a large area (roughly 46,000 square feet) that would affected by the new stream crossing over Ovid Creek (north). The estimated right of way cost for this option would be $602,500. Seven residual parcels would be created by the new SH-36 intersection, having an estimated value of $43,000. This amount does not include any residual value for the Jensen Lumber mill equipment.

A summary of the land use impacts and associated right of way costs for each option is shown in Table 27.

Table 27
Ovid Corner Improvement Options
Land Use Impacts and Estimated ROW Costs

Improvement Option	Land Use Impacts				Estimated ROW Cost
	Encroachment		Displacement		
	No. of Parcels	Area	No. of Parcels	Area	
35-MPH Curve	3	25,100 s.f.	1	3,500 s.f.	$68,500
45-MPH Curve	6	79,100 s.f.	1	3,500 s.f.	$83,000
55-MPH Curve	6	145,250 s.f.	3	214,500 s.f.	$123,000
65-MPH Curve	5	60,000 s.f.	10	1,061, 800	$602,500

Cost Estimates

The costs to complete the Ovid Corner improvement options increases as the design speed of the curve increases, ranging from $417,000 for the 35-MPH Option to $2,632,000 for the 65-MPH Option. At the higher design speeds, the larger roadway radius and longer roadway transition add significantly to the construction, engineering and land acquisition costs. A new two-lane bridge was included for the 65-MPH Option, at an estimated cost of roughly $400,000. None of the other options would require a bridge replacement. A summary of the cost estimates is shown in Table 28.

Table 28
Ovid Corner Improvement Options
Planning Level Cost Estimate Summary

Improvement Option	Cost Item				Total Cost
	Construction Costs	Constructio n Eng.	Design Eng.	Land Acquisition	
35-MPH Curve	$296,500	$26,000	$26,000	$68,500	$417,000

Table 28 (cont.)
Ovid Corner Improvement Options
Planning Level Cost Estimate Summary

Improvement Option	Cost Item				Total Cost
	Construction Costs	Constructio n Eng.	Design Eng.	Land Acquisition	
45-MPH Curve	$466,000	$41,000	$41,000	$83,000	$631,000
55-MPH Curve	$693,000	$61,500	$61,500	$123,000	$939,000
65-MPH Curve	$1,724,500	$152,000	$152,000	$602,500	$2,632,000

The cost opinion provided above is in 2005 dollars for a comparative level of evaluation. It does not include escalation, permitting, financial costs or operations and maintenance costs. In addition, there are no costs for the mitigation or remediation associated with the potential discovery of hazardous materials. This order of magnitude cost opinion was prepared for guidance in project evaluation at the time of the estimate. The final costs of the project will depend on actual labor and material costs, actual site conditions, productivity, competitive market conditions, final project scope, final project schedule and other variable factors. As a result, the final project costs will vary from the estimate presented. Because of these factors, funding needs must be carefully reviewed prior to making specific financial decisions or establishing final budgets.

Benefit/Cost Analysis

A benefit-cost analysis was performed for the project options to help determine the following:

- Whether or not any of the options should be undertaken at all (i.e., whether a project's life-cycle benefits will exceed its costs).
- Which among the different options should be selected for further consideration.

As described in the U.S. Department of Transportation's *Economic Analysis Primer*,[66] "benefit-cost analysis attempts to capture all benefits and costs accruing to society from a project or course of action, regardless of which particular party realizes benefits or costs, or the form these benefits or costs take. Used properly, benefit-cost analysis reveals the economically efficient investment alternative, i.e., the one that maximizes the net benefits to the public from an allocation of resources."

For purposes of the analysis, a "no project" option was defined, representing the continued operation of the existing alignment without major investments. Both safety and travel time benefits were then estimated for each project option relative to the "no project" option.

[66] U.S. Department of Transportation, Economic Analysis Primer, (2003).

Safety benefits were estimated using the Safety Index measure defined in ITD's Safety Evaluation Instruction Manual.[67] As described in the manual, the Safety Index is a tool for evaluating the safety benefits of highway improvement projects. It is a measure of the accident cost savings by motorists, expressed as a percentage of the capital cost of the improvement. Safety Index calculations are required for all ITD safety improvement projects.

The Safety Index is determined by estimating the number and cost of accidents that are expected to occur on an existing facility if no improvements are made, then subtracting the number and cost of accidents that are expected to occur with the improvement. This accident cost savings, when divided by the cost of providing the improvement, is the Safety Index, or benefit/cost ratio. A spreadsheet developed by ITD was used to calculate the index for each of the project options.

Travel time benefits were estimated for the 45-MPH, 55-MPH, and 65-MPH Options based on the travel time savings that would result from the higher design speeds and shorter travel distances through the Ovid curve compared to the existing alignment. With the 45-MPH and 55-MPH options, there would be lower delay compared to the existing alignment due to the decreased time needed to:

- Decelerate from the existing higher speed limits approaching the curve to the lower speed limit along the curve;
- Travel through the curve; and
- Accelerate from lower speed limit along the curve back to the higher speed limits beyond the curve.

With the 65-MPH option, the travel delay would be completely eliminated, since the speed limit through the curve would be the same as those on either side of the curve.

Annual travel time savings was calculated by multiplying the time savings per trip by the existing AADT. Total travel time savings over the life of each project option was then obtained by multiplying the annual travel time savings by the Volume Correction Factor and the service life of the project. This was converted to a total benefit by applying a value of personal travel time. The U.S. Department of Transportation recommends that local personal travel time should be valued at 50 percent of average wage.[68] For the project area, a value of $7.21/hr. was used based on information obtained from the Idaho Commerce and Labor, Department.[69]

The travel time and safety benefits were added together to produce the total benefit associated with each project option. A final benefit/cost (B/C) ratio was then calculated

[67] Idaho Transportation Department, Safety Evaluation Instruction Manual, (2002).
[68] U.S. Department of Transportation, Economic Analysis Primer, (2003).
[69] Idaho Commerce and Labor, (2005), Idaho Occupational Employment and Wage Survey-2005, URL: http://cl.idaho.gov/portal/, visited April 1, 2005.

as the total benefit divided by the total cost. The table below summarizes the results of the analysis for each option.

Table 29
Ovid Corner Improvement Options
Benefit-Cost Analysis Summary

Imp. Option	Benefit ($1,000)			Cost	B/C Ratio		Annual Benefit	
	Safety	Travel Time	Total		Safety	Total	Safety	Total
35-MPH	418.9	0	418.9	417.0	1.005	1.005	$20,945	$20,945
45-MPH	418.9	211.3	630.2	631.0	0.664	0.999	$20,945	$31,510
55-MPH	418.9	361.4	780.3	939.0	0.446	0.831	$20,945	$39,013
65-MPH	888.1	548.9	1,437.0	2,632.0	0.337	0.546	$44,400	$71,850

Total safety and travel time benefits over the life of the project are shown separately, as well as the combined total benefit. The safety benefit for the Base, 45-MPH, and 55-MPH Options are identical because same set of accidents and the same method for calculating the Safety Index were used for each option. The safety benefit for the 65-MPH Option is significantly higher than the benefit for the first three options because, according to the procedure contained in the ITD manual:

- A different (expanded) set of accidents was used, since the project area for this option was defined as a "segment" rather than a "spot intersection".
- The Safety Index calculation method used for the 65-MPH Option includes benefits resulting from the reduction in both the number and severity of accidents, whereas the method used for the other options includes only benefits resulting from the reduction in accident severity.

The travel time benefit for the 35-MPH Base Option is zero, because this option does not include any improvements that would result in an increase in the design speed of the curve. The travel time benefits for the 45-MPH, 55-MPH, and 65-MPH Options are roughly proportional to the increase in the design speed of the curve with each option. It is interesting to note that the travel time benefit accounts for between one-third and one-half of the total benefit for these options.

Separate B/C ratios were calculated for safety benefits only and total benefits. The highest B/C ratios (1.005) would be achieved with the 35-MPH Option. The ratios are the same because there would be no travel time savings benefit for this option. The ranking of the remaining options in order of their B/C ratios is: 45-MPH Option, 55-MPH Option, and 65-MPH Option. All of these options have B/C ratios less than one since the safety and travel time benefits are more than offset by the increased cost of the improvements. This is particularly true for the 65-MPH Option, which has significantly higher safety and travel time benefits than the other options, but nearly triple the cost of the next-most expensive option.

The final measure shown in the table is the annual benefit. As calculated using the ITD procedure, this is simply the total benefit over the life of the project divided by the service life of the project. Annual safety benefits only as well as total benefits are shown.

Recommended Ovid Corner Improvement Option

Based on the results of the evaluation, the 35-MPH Option is recommended because, with the exception of the 65-MPH Option, it would provide identical safety benefits compared to the other options at a significantly lower cost. This is reflected in the overall B/C ratio of greater than 1.0 for the 35-MPH Option, compared to the B/C ratios of less than 1.0 for the other options. Although there would be travel time benefits associated with the other options and none with the 35-MPH Option, the primary reason for this project is to improve safety conditions, not to reduce travel time.

By intersecting US 89 and SH-36 with a “T” intersection, the 35-MPH Option provides better visibility for SH-36 traffic turning onto US 89 compared to the existing intersection configuration. With the “T” intersection, drivers would not have to look over their shoulders to see oncoming vehicles. This option also reduces the number of access points on US 89 by combining the two intersections into one. With fewer access points, drivers on US 89 would encounter fewer conflicts, resulting in improved safety.

The addition of the turn lanes allows vehicles to slow down and possibly stop outside of the main travel lanes. Removal of turning vehicles from the through travel lanes would reduce the likelihood of rear end collisions as well as decrease the delays associated with those vehicles.

Finally, the land use impacts of this option would be minimal and there would be no impacts to the adjacent wetlands.

Segment 4 – Ovid Corner – Montpelier E. City Limit

Shoulder widening is recommended between Ovid Corner and Cutler Ln. (M.P. 20.23 – M.P. 22.45) to increase the existing substandard shoulder widths to 6 feet. Wetland areas, which are nearly continuous along both sides of highway within this section, would be moderately to significantly impacted by this improvement, requiring mitigation.

The Ovid Creek Bridge at M.P. 20.40 should be widened to meet ITD’s bridge width standard. Although the standard for this bridge calls for the width to be equal to the width of the approach lanes plus 4-feet on either side, it is recommended that it be widened to 6-feet on either side in case future traffic volumes are higher than the forecast volumes.

Shoulder widening is also needed between M.P. 24.00 (west of Bern Rd.) and M.P. 24.80 (west of the 12th St. Overpass). Conditions here are similar to those between Ovid Corner and Cutler Ln., with nearly continuous wetlands along both sides of the highway, which would need to be mitigated with this improvement.

To accommodate bicyclists on the 12th St. Overpass in Montpelier, installation of advance warning signs is recommended to alert drivers when bicyclists are on the overpass. The signs would be located on each end of the overpass and would be activated with a push-button by bicyclists prior to crossing the overpass.

Within Montpelier, the only recommended roadway improvements are at the intersection of 4th St. (US 89/US 30)/Clay St. (US 89). These are the installation of northbound and southbound right-turn lanes on 4th St. and the placement of a flashing red beacon on the existing stop sign on the westbound approach of Clay St. to increase driver awareness of the stop sign.. Installation of the turn lanes on 4th St. would require restriping only (no widening).

Over the long-range, installation of a traffic signal is recommended at this intersection to address the level of service deficiency that would occur. Further study will be required, however, prior to implementing this improvement.. Another option that was considered would be to reroute westbound traffic on Clay St. south along 3rd St., and then west along Washington St. to the intersection of 4th St./ Washington St. Third St. is currently a local street with residences along both sides of the street. This option would divert a large proportion of the future traffic volume from the 4th St./Clay St. intersection to the currently signalized 4th St./Washington St. intersection, thus eliminating the need for a signal at 4th St./Clay St. The significant increase in traffic along 3rd St. that would result with this option, together with the required improvements to accommodate these volumes, were considered to be too disruptive to the surrounding neighborhood, however.

No bicycle facility improvements were identified within Montpelier, as US 89 was considered to provide ample width for the existing “bikeway on shared roadway”-type facility. The only recommended pedestrian improvement is the construction of sidewalks along 4th St. between Washington St. and Clay St.

Access Management Strategy

The recommended improvements presented in the previous section are an important element of the Corridor Plan to achieve maximum efficiency and effectiveness for future corridor uses. Another important element for achieving this goal not related to physical improvements in the corridor is the establishment of an access management strategy for the corridor. The establishment of and adherence to a sound access management strategy can minimize the need for costly future improvements, while preserving the primary function of the corridor.

As described in Section II., many of the existing deficiencies along US 89 are related to vehicles accessing the highway. This creates conflicts between vehicles moving at slower speeds attempting to turn into or out of private accesses and higher-speed through-traffic. In areas where private accesses are closely spaced, drivers are required to react to a complex pattern of overlapping conflicts. This is particularly true in the Bear Lake area during the peak summer recreational season, where there are frequent turns into and out of closely-spaced residential driveways along the lake, many involving vehicles with trailers. Access problems also occur at other locations along the corridor, such the agricultural areas between St. Charles and Montpelier, where farm vehicles and equipment using US 89 to move between fields create conflicts with the general traffic on the highway.

Access conflicts also degrade the primary function of US 89, which, as principal arterial, is to "serve corridor movements having trip length and travel density characteristics indicative of substantial statewide or interstate travel".[70] Thus, the focus for US 89 should be on carrying long-distance through trips, not local trips accessing the highway for short distances. In areas with existing access problems, however, this role has almost become reversed.

Once development has occurred along a highway and private accesses to the development have been granted, it can be very difficult to mitigate access problems that may have resulted. This is true in Bear Lake area where, as described in the previous section, the possibility of constructing frontage roads was investigated, but found to be too problematic because of the lack of space between the highway and the adjacent residences. Other solutions, such as the construction of bypasses, have excessive costs and potentially significant environmental impacts. Therefore, the most effective approach in avoiding these problems is to establish an access management strategy or policy, and then follow that strategy in determining how access is to be provided for future development.

Access management is the systematic control of the location, spacing, design, and operation of driveways, median openings, interchanges, and street connections to a roadway. It also involves roadway design applications, such as median treatments and auxiliary lanes. The purpose of access management is to provide vehicular access to land development in a manner that preserves the safety and efficiency of the transportation system. It is particularly important along arterials and other primary roads that are expected to provide safe and efficient movement of traffic, as well as access to property.

Access management is important because roads are an essential public resource that are costly to build and to improve or replace. With constrained revenues, it is not practical to allow a major arterial roadway to deteriorate under the assumption that it will be replaced or reconstructed in the future. The management of roadway access can extend the life of roads and highways, increase public safety, reduce traffic congestion, and improve the appearance and quality of the built environment. Access management not only preserves

[70] Idaho Transportation Department, Transportation in Your Local Comprehensive Plan, (1998).

the transportation functions of roadways, but it also helps preserve long-term property values and the economic viability of abutting development.

The beneficiaries of access management include:

- Motorists
  - Face fewer decision points and traffic conflicts, which simplifies the driving task and increase driver safety
  - Experience fewer traffic delays and arrive more quickly at their destinations
- Cyclists
  - Face fewer decision points and conflicts with traffic, which simplifies the cycling task and increases safety for cyclists
  - Benefit from more predictable motorist travel patterns
- Pedestrians
  - Face fewer and less frequent access points where motorists enter and exit the roadway, thereby making it safer to walk along major roadways
  - Can use medians as a refuge when crossing traffic lanes

Failure to manage access is associated with the following adverse social, economic and environmental impacts:

- An increase in vehicular crashes;
- More collisions involving pedestrians and cyclists; and
- Accelerated reduction in roadway efficiency.

On the other hand, research has shown that an effective access management program can reduce crashes by as much as 50%, increase roadway capacity by 23% to 45%, and reduce travel time and delay by as much as 40% to 60%.[71]

Access Management Policy, Standards, and Procedures

Idaho Code Sections 40-310(9), 40-311(1), 40-313(2), 40-321, 40-2319, 49-202(19), (23) and (28), and 49-221 give the Idaho Transportation Board authority to control encroachments within State Highway System rights-of-way.[72] ITD has established this control through three primary documents:

- IDAPA 39.03.42, titled "Rules Governing Highway Right-of-Way Encroachments on State Rights-of-Way
- Administrative Policy A-12-01, titled "State Highway Access Control"

[71] Transportation Research Board, Access Management Manual, (2003).
[72] Idaho Transportation Department, Access Management: Standards and Procedures for Highway Right-of-Way Encroachments, (2001).

- "Access Management: Standards and Procedures for Highway Right-of-Way Encroachments"

IDAPA 39.03.42

The purpose of IDAPA 39.03.42 is to establish standards and guidelines for encroachments on state highway rights-of-way. It includes the definition of access types based on current functional classification, with the intent of upgrading access control on all segments of the state highway system to match the most current functional classification. There are five access types associated with the following functional classifications:

- Type I – Major Collector
- Type II – Minor Arterial
- Type III – Principal Arterial
- Type IV – Principal Arterial, Multi-Lane, Divided
- Type V – Interstate

The rule also includes general regulations and location and design standards for approaches, general regulations for medians and auxiliary lanes, and procedures for addressing unauthorized and nonstandard encroachments.

As a part of the location and design standards for approaches, the rule presents minimum recommended distances between approaches and signals, shown in Table 30.

Table 30
Approach and Signal Spacing Standards

ACCESS TYPE	URBAN/ RURAL	TYPE	APPROACHES		SIGNALS	FRONTAGE ROADS
			Intersection Spacing	Approach Spacing	Signal Spacing	
I	Urban Sections Shall Be Upgraded To Type II Or Greater					
	R	At-grade	.4 km (.25 miles)	91.4 m (300 feet)	.8 km (.5 miles)	.4 km (.25 miles)
II	U	At-grade	201.2 m (660 feet)	45.7 m (150 feet)	.4 km (.25 miles)	.4 km (.25 miles)
	R	At-grade	.4 km (.25 miles)	.15 km (500 feet)	.8 km (.5 miles)	.4 km (.25 miles)
III	U	At-grade/ Interchange	.4 km (.25 miles)	91.4 m (300 feet)	.8 km (.5 miles)	.4 km (.25 miles)
	R	At-grade/ Interchange	.8 km (.5 miles)	.3 km 1000 feet)	.8 km (.5 miles)	.4 km (.25 miles)
IV	U	At-grade/ Interchange	.8 km (.5 miles)	NA	.8 km (.5 miles)	.4 km (.25 miles)
	R	At-grade/ Interchange	1.6 km (1 mile)	NA	1.6 km (1 mile)	.4 km .25 miles)
V	U	Interchange	1.6 km (1 mile)	NA	None	NA
	R	Interchange	4.8 km 3 miles)	NA	None	NA

The access requirements become more restrictive as the access type and associated functional classification increases. For Access Type I, for example, the allowable intersection spacing is .25 miles, with a minimum approach spacing of 300 feet and minimum signal spacing of .5 miles. For Access Type IV, however, the intersection and signal spacing requirements are 1 mile, and frontage roads are the only type of approach that is allowed.

ADMINISTRATIVE POLICY A-12-01

Administrative Policy A-12-01 describes ITD administrative procedures for the regulation of access control on the state highway system. These include:

- Regulation of access control in conjunction with the Federal Highway Administration (FHWA) when federal funds are involved, and in urban areas, coordination with the appropriate local agencies.
- Authority of the District Engineer and/or local highway agencies to issue encroachment permits on the system where Type I through Type III access control exists, if adequate local ordinances are in place.
- Documentation requirements for new accesses or changes in location, size, or use of existing accesses.

- Approach, intersection, and signal spacing requirements by access type per IDAPA. 39.03.42.
- Permitting of public highway connections and new private approaches under Type I through Type III access control.
- Access provisions for landlocked parcels adjacent to the highway.
- Variances to signal spacing guidelines.

STANDARDS AND PROCEDURES FOR HIGHWAY ROW ENCROACHMENTS

ITD's "Standards and Procedures for Highway Right-of-Way Encroachments" serves as the implementing document for the general standards and guidelines contained in IDAPA 39.03.42 and the administrative procedures contained in Administrative Policy A-12-01. It contains information on the conditions under which a permit is required to encroach upon state highway rights-of-way, access type standards, the permit process, location and design standards for approaches, utilities, and other encroachments, and other requirements related to the construction and maintenance of approaches. Some of the more important standards and procedures include:

- An approved State highway right-of-way encroachment permit is required for all residential, commercial, and agricultural approaches, as well as for public approaches to the State highway system.
- Changes in access control may be affected by ITD Board decisions to modify or close approaches or reconstruct or widen roadways, urban access control, and State and Federal regulations that restrict access.
- A more restrictive type of access control may be applied to a roadway with a lower level functional class if a section of that highway operates in a manner similar to highways within a higher functional class.
- Public highway connections and new private approaches may be permitted for Type II through Type IV access control in accordance with the spacing standards in Table 30 and ITD design principles and restrictions. Joint use approaches are encouraged, as well as frontage roads for existing approaches as land uses change. As mentioned above, however, frontage road access is the only type of new approach that is allowed for Type IV access control.
- Under Type IV access control, all existing and new public roads and private approaches must meet ITD spacing standards.
- The maximum number of approaches per side per mile for Type III access control is four in urban areas and three in rural areas. This includes all existing approaches plus any additional approaches.
- Access management guidelines for new approaches include the application of channelization, auxiliary lanes, approach offsets, joint-use approaches, inter-parcel access, frontage roads, and physical barriers along property frontage to prevent uncontrolled access.

- The placement of medians should be managed to enhance the efficiency and safety of highways and support approved land use patterns. Non-traversable medians are the preferred median type. Continuous two-way left-turn lanes may be considered on urban two-lane highways with a posted speed of 45-mph or less.

Application of Standards and Procedures

Based on its current functional classification as a two-lane principal arterial, US 89 falls into the Type III access control category. Principal arterial highway segments are characterized as having medium to high traffic volumes and speeds that vary from medium (urban areas) to high (rural areas). This functional classification establishes specific access management requirements for US 89, according to the ITD access management practices described above:

- The type of access may be either at-grade or grade-separated (interchange).
- Intersection and approach spacing standards are .25 miles and 300 feet, respectively, in urban areas and .5 miles and 1,000 feet in rural areas. Signal and frontage road spacing standards are .5 miles and .25 miles in both urban and rural areas.
- Public highway connections and new private approaches may be permitted in accordance with ITD spacing standards. Joint use approaches should be encouraged, as well as frontage roads for existing approaches as land uses change.
- The maximum number of approaches per side per mile is four in urban areas and three in rural areas. This includes all existing approaches plus any additional approaches.
- As a part of the permitting process for public highway connections and new private approaches, right of way for frontage roads will be provided when appropriate and will be obtained in the name of the entity having jurisdiction.

The findings from the transportation and land use analyses presented in Sections II. and III. indicate that these access management requirements would be the most beneficial along the US 89 corridor in the Bear Lake area , where most of the existing access problems are concentrated. Without improvements, these deficiencies will likely worsen in the future as traffic volumes increase and development expands into the area between Fish Haven and St. Charles. Although access problems related to farm traffic entering/exiting the highway exist in other portions of the corridor between St. Charles and Montpelier, these can be largely addressed through the recommended improvement measures, such as the widening of shoulders to 10 feet. Within Montpelier, no significant access problems were identified for either existing or future conditions.

Existing Access Conditions

As described in Section II., current access conditions in the Bear Lake area between the Utah state line and the north end of Fish Haven are characterized in general by the following:

- Driveway traffic conflicts, particularly south of Fish Haven Creek
- Need for a center turn lanes and/or intersection turn lanes
- Vehicles parked on the roadway and a lack of lake access parking
- The need for scenic pullouts
- General congestion

The types of access are either at-grade intersections or private approaches. Nearly all of the private approaches are accesses to residences or farms, with only a few accesses to small commercial establishments, such as the community store at Fish Haven Canyon Rd. in Fish Haven.

Consistent with the existing and anticipated future levels of development, the urban area access spacing standards for Type III facilities would apply to US 89 in the Bear Lake area. These standards are .25 mile spacing for intersections and frontage roads and 300 foot spacing for approaches. The signal spacing standard would not apply in this area.

As shown in Table 31 on the following page, the existing intersection spacing, which ranges between 0.5 – 1 mile for each segment, is well within the standard. The approach spacing standard is not met at many locations however. One measure of this is the average approach spacing, shown in Table 31, which is below 300' for all but one segment. Although the approach spacing standard is meant to be applied on an approach-by-approach basis, these averages show that even if all of the approaches were located at uniform intervals, the standard would still not be met. In reality, the existing spacing is significantly worse than what is shown in the table for most locations because the accesses tend to be clustered together, with less than 100' between approaches in some areas. As would be expected, the average approach spacing is the smallest within the more developed areas of Fish Haven and to the immediate south of Fish Haven and the largest for the segments between the Utah State line and Loveland Ln.

As with the approach spacing, the number of approaches substantially exceeds ITD's goal of 4 approaches per mile per side of the highway in urban areas. As can be seen in Table 31, this number ranges from 11 to as high as 35 within Fish Haven.

Table 31
Existing Intersection and Approach Spacing
Bear Lake Area

Segment		Intersection Spacing (mi.)	No. of Approaches			Avg. Spacing		Approaches/Mile	
From	To		e/o US 89	w/o US 89	Total	e/o US 89	w/o US 89	e/o US 89	w/o US 89
Utah State Line	Lake West Blvd.	N/A	3	3	6	282’	282’	19	19
Lake West Blvd.	Lakeside Dr.	0.99	23	18	41	227’	290’	23	18
Lakeside Dr.	Loveland Ln.	0.90	10	17	27	475’	280’	11	19
Loveland Ln.	Fish Haven Canyon Rd.	0.67	18	16	34	197’	221’	27	24
Fish Haven Canyon Rd.	N. Fish Haven	N/A	13	12	25	150’	163’	35	32

Access Management Measures

Access management can be used in two different ways along US 89 within the Bear Lake area. The first approach is to address existing access deficiencies, while the second approach is focused on ensuring adequate access for future development within the corridor, while preserving its primary function of providing mobility for longer-distance trips.

As is true for many highway corridors, the US 89 corridor has problem sections within the Bear Lake area that are already developed and may never meet minimum access management standards. Existing access conditions can be improved over time, however, by implementing improvements as a part of roadway reconstruction projects or when opportunities arise because of a change in land use. These include improvements to the roadway itself as well as measures to improve existing accesses to the roadway.

The following are the general types of roadway improvements that could be applied within the Bear Lake area to address existing access deficiencies:

- Continuous two-way center turn lanes

  More than two-thirds of all access-related collisions involve left-turning vehicles. Where left-turns are made from a through lane, virtually all through vehicles in the shared lane are blocked by the left-turning vehicle. Research indicates that two-way center turn lanes can result in a 35% reduction in total crashes, a 30% decrease in delay, and a 30% increase in capacity.[73] They are generally appropriate for roadway sections with less than 24,000 vehicles per day and where numerous, closely spaced, low-volume access connections already exist. Conflicting left turns from opposite directions can result from two-way center turn lanes, such as when closely spaced, offset access connections on opposite sides of the roadway result in overlapping maneuvers.

- Left-turn lanes

  A left-turn lane provides an auxiliary lane to remove left-turning vehicles from the through-traffic lane on an undivided roadway. This allows drivers to decelerate gradually out of the through lane and wait in a protected area for an opportunity to turn, thereby increasing intersection safety and reducing delay for through traffic. Overall crash rates for rear-end and left-turn collisions may be reduced by 75% at unsignalized accesses, with a 25% increase in capacity.[74]

- Shoulder bypasses

  This technique may be applied to three-way intersections where space is not available for an isolated left-turn bay or as a temporary solution until a left-turn

[73] Transportation Research Board, Access Management Manual, (2003).
[74] Transportation Research Board, Access Management Manual, (2003).

lane can be constructed. It is appropriate for locations with low left-turn volumes, such as where turn lane warrants are not met, and low-volume roadways. Shoulder bypasses are relatively inexpensive to implement and take less space than a left-turn lane. They are less safe than left-turn lanes, however, and drivers may be less familiar with this technique.

- Right-turn lanes

  Right turn lanes improve traffic safety where there is a pattern of rear-end collisions, and can result in a 20% reduction in total crashes.[75] They limit right-turn interference with platooned traffic flow, increasing capacity and reducing delay.

- Acceleration and deceleration lanes

Measures to improve existing accesses include the following:

- Reconstruction, relocation, or closure of driveways

  This measure may be applied to driveways that are non-conforming in relation to desired connection spacing, location, and design. Improvements to existing accesses may be accomplished during roadway reconstruction projects. An example of this is the alignment of opposing driveways in order to minimize left-turn conflicts, or if this is not possible, offsetting driveways on opposite sides of the roadway by a minimum distance to reduce overlapping left-turns and other maneuvers that may result in safety or operational problems. It may also include the separation of driveways from intersections to provide adequate corner clearance, which is the distance from the intersection to nearest edge of the adjacent approach. This improves safety and intersection capacity, because through traffic is allowed to maneuver through the intersection without conflicts with turning vehicles that are entering and leaving the roadway.

- Consolidation of accesses

  Shared accesses improve roadway safety by reducing conflict points and separating conflict areas, which also results in smoother traffic flow. Separation of conflict areas is widely recognized as an effective way to improve vehicular safety, as well as pedestrian and bicycle safety. For example, increasing the average access spacing from 150 feet to 350 feet along a roadway can be expected to reduce the crash rate by about 50%.[76] Long spacings also permit the installation of auxiliary lanes that reduce interference on through traffic caused by turning vehicles. This measure results in fewer, but higher-volume, access connections accommodating turning vehicles more safely.

[75] Transportation Research Board, Access Management Manual, (2003).
[76] Transportation Research Board, Access Management Manual, (2003).

- Adoption of an access management redevelopment policy

  A redevelopment policy encourages the improvement of accesses during redevelopment or an expansion of an existing use. It involves the establishment of criteria whereby existing properties must come into conformance with access management policies and standards, to the extent feasible, when they redevelop or a change in use occurs. The goal is to increase access spacing and improve access design where changing conditions permit, over a long period of time. Some flexibility in applying the standards can be provided by adopting criteria for deviations from the standards.
- Purchase of strategic vacant or abandoned properties, with resale that includes access restrictions
- Placement of barriers along unlimited access points to define driveway access

As mentioned above, once development has been allowed to occur along the highway without adequate access provisions, it is often difficult, if not impossible to achieve minimum access management standards. Therefore, in areas that are currently less developed but where growth is expected to occur, it is important to ensure adequate future access conditions prior to development taking place.

All of the roadway improvements described above to address existing access deficiencies within the Bear Lake area could also be considered for future development. In addition to these improvements, there are several other policy, land use, and roadway improvement measures that can only be implemented, or are easier to implement, prior to development taking place. These include:

- Requirement of traffic impact studies for proposed development projects

  Traffic impact studies are essential for many access management issues that need to be addressed when the details of a development are known. Conditions that may require a traffic impact assessment include rezoning, subdivision applications, building permits, plan amendments, permits for major driveways, and site plan approval.
- Increase of minimum lot frontage and setback requirements

  Establishing higher lot frontage and dimensional requirements allows for greater spacing between commercial and residential driveways.
- Increase of minimum lot size for corner lots to improve corner clearance

  Corner clearance standards preserve efficient traffic operations at intersections and the safety and convenience of access to corner properties. Adequate lot size is particularly important for commercial uses such as gas stations with convenience stores and other uses with drive-through facilities.

- Establishment of desirable access points before property is subdivided or developed

  This is sometimes done through the development of a corridor access management plan that identifies the preferred location and design of property access systems along the corridor. Access management plans can be used as a guide for accomplishing desirable access location and spacing as corridor properties develop or redevelop.

- Elimination of left-turn ingress and egress at driveways within the influence area of intersections

  This may involve providing short sections of a median divider and/or adopting a driveway design that discourages or prevents left-turn maneuvers.

- Installation of non-traversable medians

  A non-traversable median is a physical barrier that separates traffic traveling in opposite directions, such as a concrete barrier or landscaped island, or a grassy, slightly depressed area that is more common in rural areas. Roadways with non-traversable medians are safer than undivided roadways and those with continuous two-way center left-turn lanes, with average crash rates about 30% less than on roadways with a two-way center turn lanes.[77] Other advantages are that: 1) left-turn locations can be made clearly identifiable to drivers; 2) a refuge area is available for drivers and pedestrians to cross the traffic stream; 3) access connections on opposite sides of the highway can be more closely spaced because left-turn conflicts are reduced; and 4) there can be less delay to through vehicles than with a two-way center turn lane. One disadvantage is that if the non-traversable median is raised, snow removal is more difficult.

- Provision of alternative access roads or connecting supporting street systems

  Ideally, no individual driveways should be located along the highway. Rather, side streets, parallel roads, and interparcel circulation systems can be used to meet the access needs of existing and planned development. Benefits of an adequate supporting street system include the reduced need for individual driveway access to the principal roadway and the availability of alternate routes for short local trips, thereby reducing traffic congestion on the highway.

- Construction of frontage roads

  Frontage roads give direct access to abutting properties while limiting access to the main lanes of the major roadway, thereby separating local land-service traffic from through traffic and reducing the number of direct access connections to the highway.

Decisions about which access management measures should be used to address existing and future access needs within the Bear Lake area and the specific locations where they

[77] Transportation Research Board, Access Management Manual, (2003).

should be applied should be made within an access management plan. The purpose of an access management planning effort is to evaluate roadway design, access, and traffic characteristics and propose changes that improve the safety and operation of the highway. The plan can serve as a guide for agencies with regard to permitting and capital improvement decisions and for prospective developers with regard to approved access locations and areas where service roads or access agreements may be required for consolidation of access with adjacent properties.

Access management plans typically comprise a map and report establishing desired access scenarios. The general steps involved in the development of a plan are:

1. Definition of the study area
2. Policy and land use analysis
3. Traffic analysis
4. Evaluation of roadway geometrics
5. Inventory of site access and circulation
6. Development of access management alternatives
7. Evaluation of alternatives
8. Plan adoption and implementation

Access management plans may be implemented through a combination of regulations, inter-agency or public-private agreements, and roadway improvement projects. Corridor access management plans are especially helpful for coordinating land development and access management on roadways under state jurisdiction and can be used to define the roles and responsibilities of all involved agencies.